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**Crow et al.**

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(54) **DOOR ASSEMBLIES FOR IMAGE CAPTURE DEVICES**

(71) Applicant: **GoPro, Inc.**, San Mateo, CA (US)

(72) Inventors: **Kielan C. Crow**, San Mateo, CA (US);  
**Juntao Sun**, Shenzhen (CN); **Matt Baker**, San Diego, CA (US)

(73) Assignee: **GoPro, Inc.**, San Mateo, CA (US)

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(60) Provisional application No. 62/901,953, filed on Sep. 18, 2019.

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**G03B 17/08** (2021.01)

(52) **U.S. Cl.**  
CPC ..... **G03B 17/08** (2013.01); **G03B 2217/002** (2013.01); **G03B 2217/007** (2013.01)

(58) **Field of Classification Search**

CPC ..... G03B 17/08; G03B 2217/002; G03B 2217/007

See application file for complete search history.

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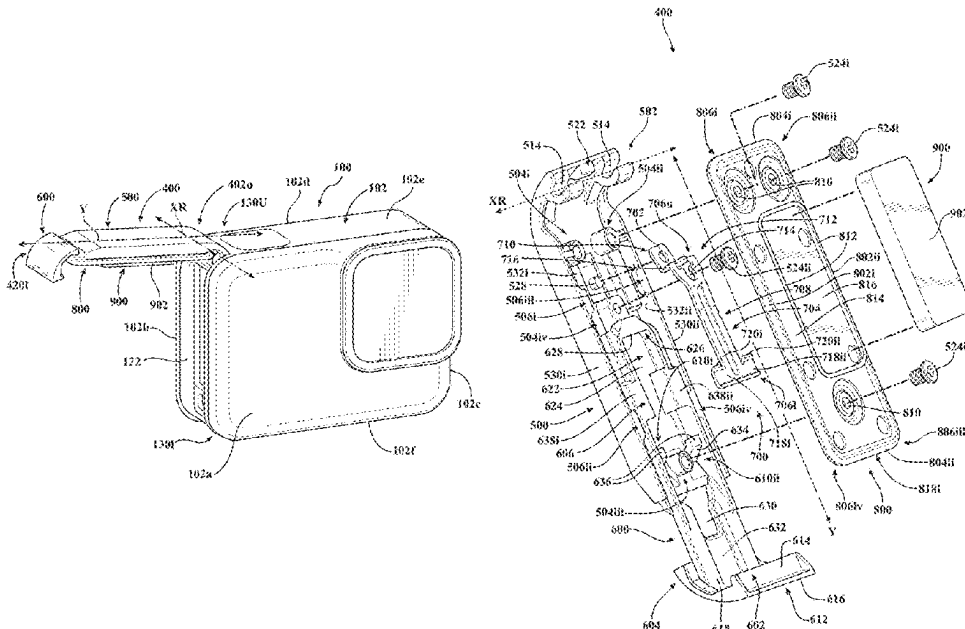
*Primary Examiner* — Ahmed A Berhan

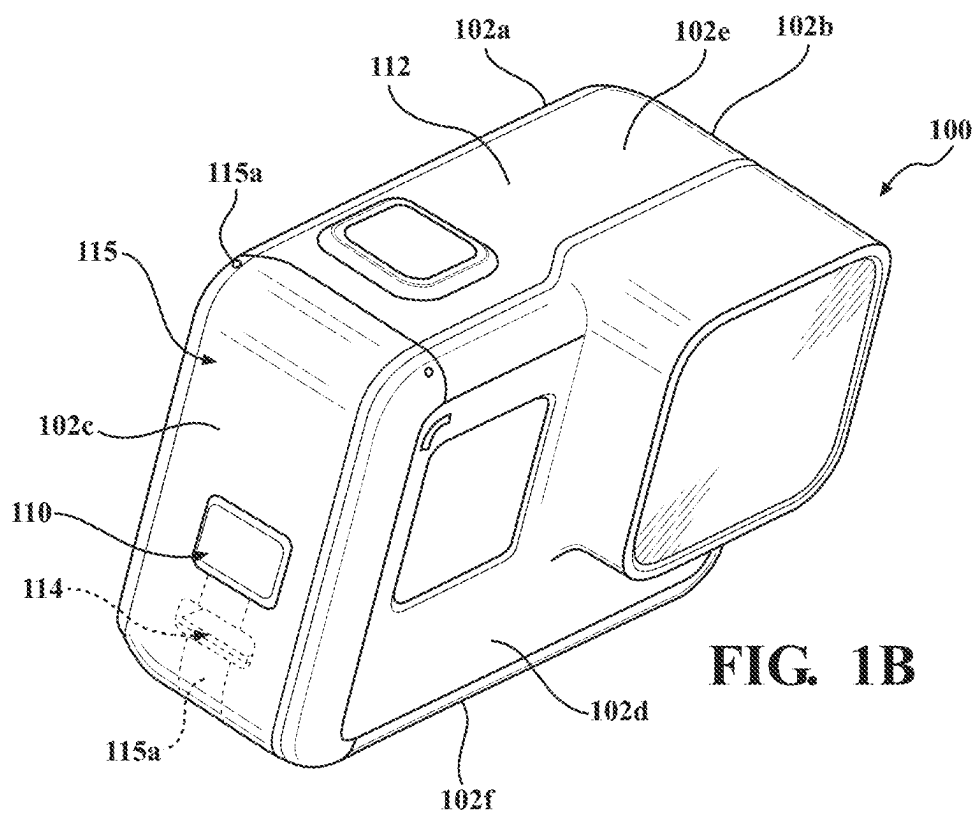
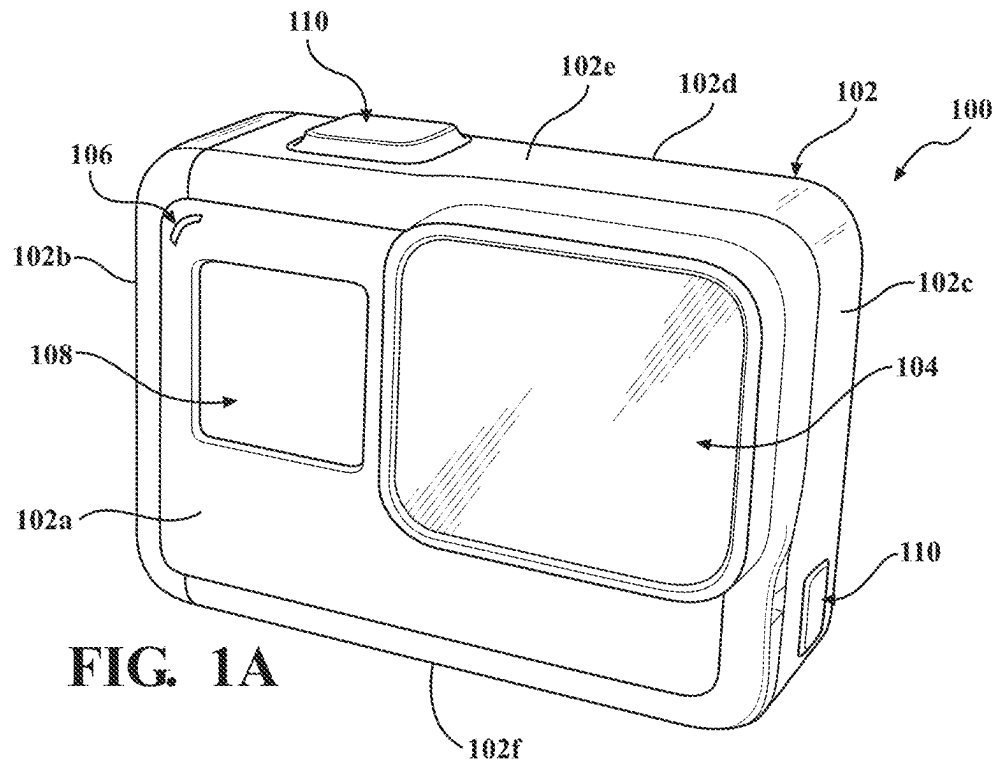
(74) *Attorney, Agent, or Firm* — Young Basile Hanlon & MacFarlane, P.C.

(57) **ABSTRACT**

An image capture device is disclosed that includes a body defining a peripheral cavity and a removable door assembly that is configured to close and seal the peripheral cavity. The door assembly includes a door body; a locking mechanism; and a biasing member that is configured for engagement with the locking mechanism to resist unlocking of the locking mechanism until a threshold force is applied, at which time, the biasing member is moved from a normal position, in which the biasing member extends at a first angle in relation to the locking mechanism, to a deflected position, in which the biasing member extends at a second angle in relation to the locking mechanism. When locked, the door assembly is rotationally fixed in relation to the body of the image capture device, and when unlocked, the door assembly is rotatable in relation to the body of the image capture device.

**20 Claims, 21 Drawing Sheets**





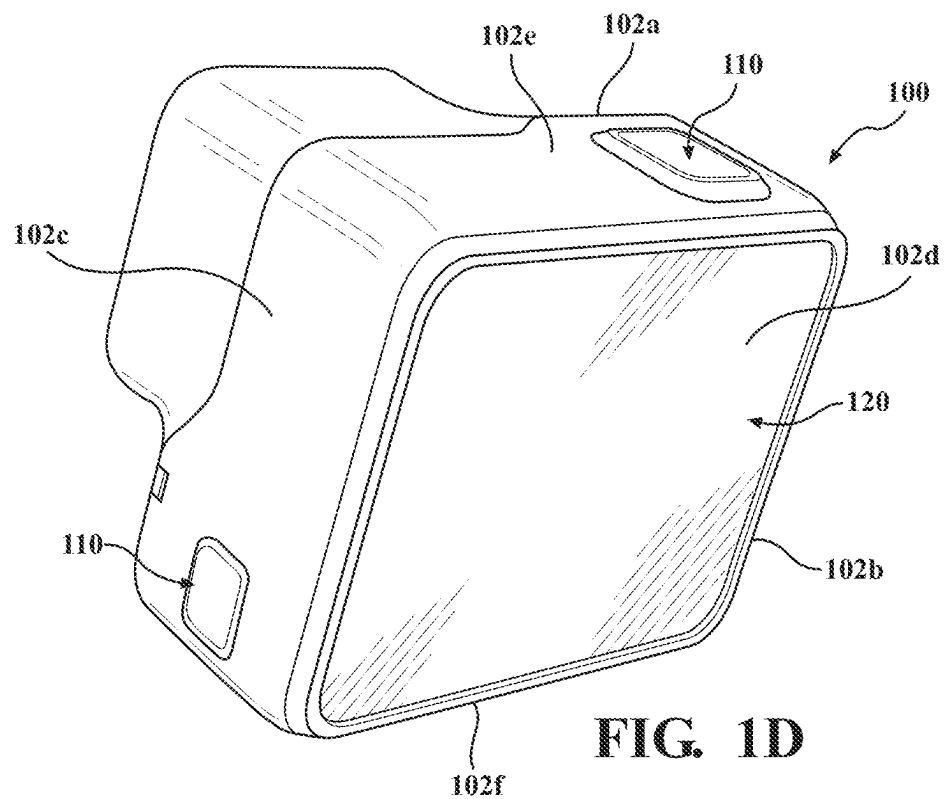
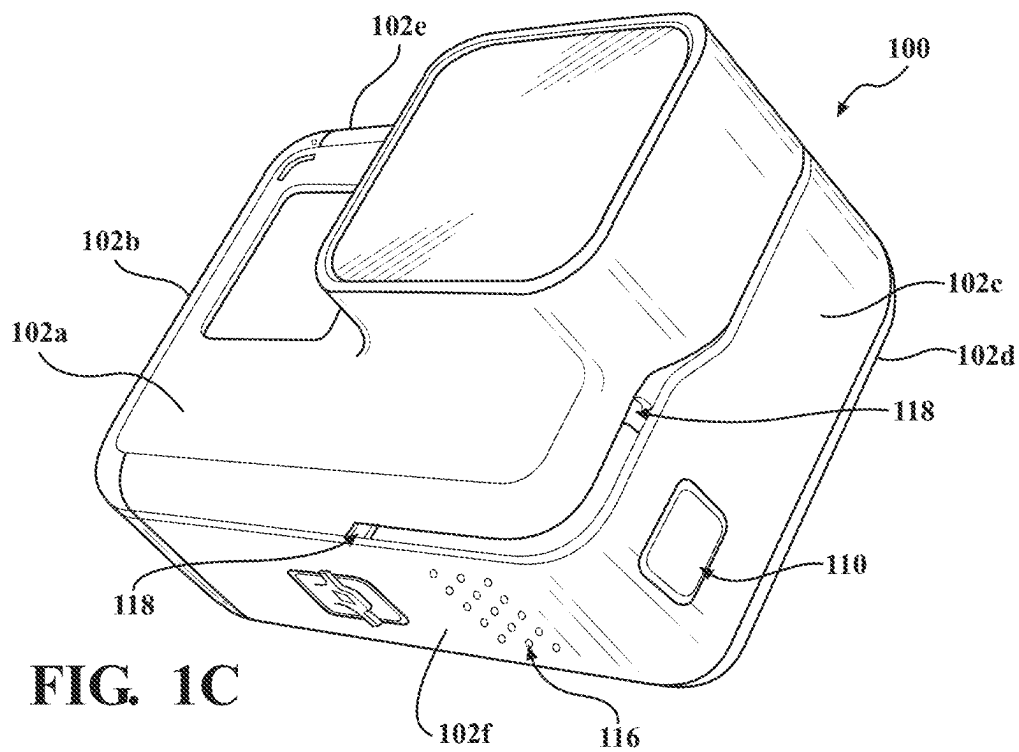


FIG. 2A

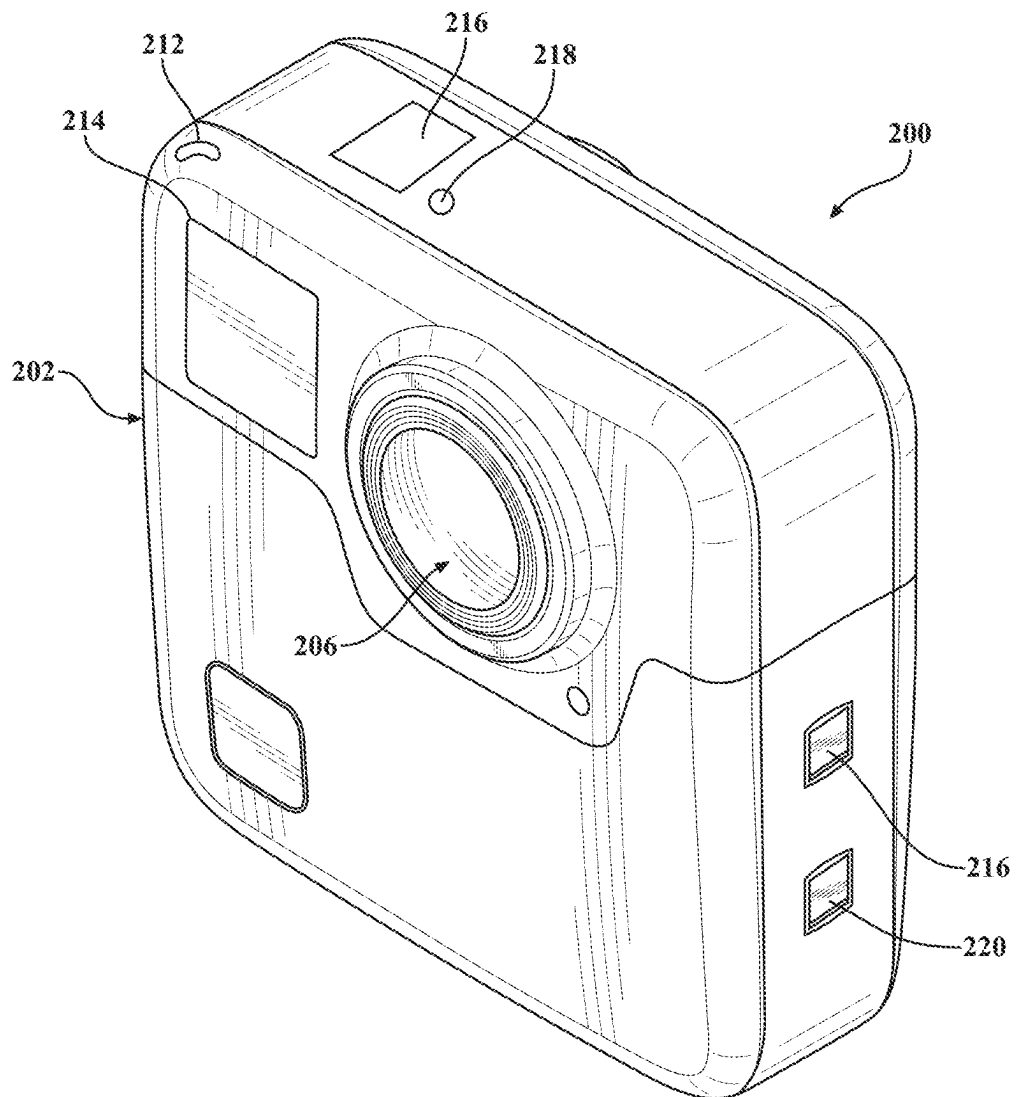
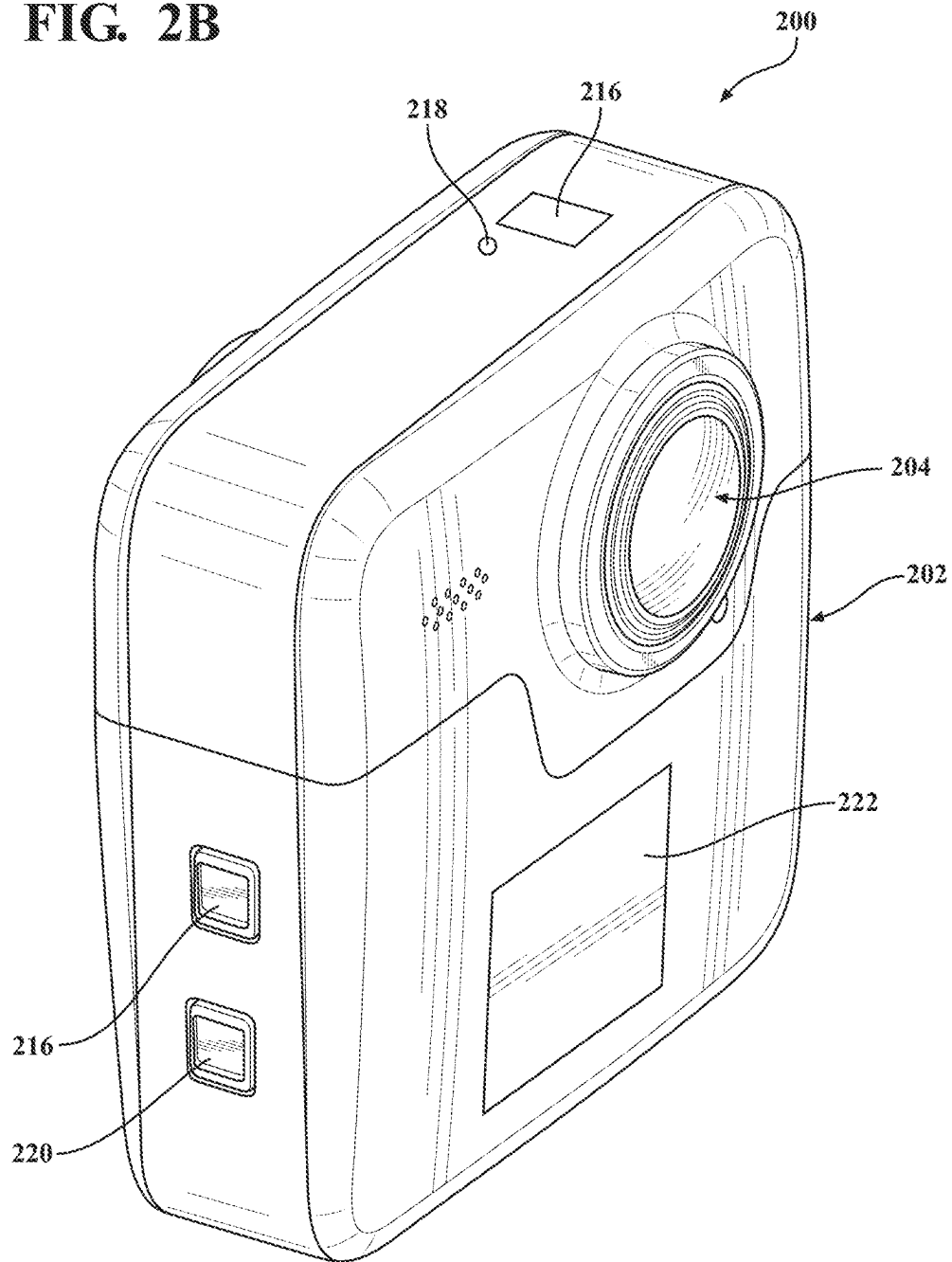
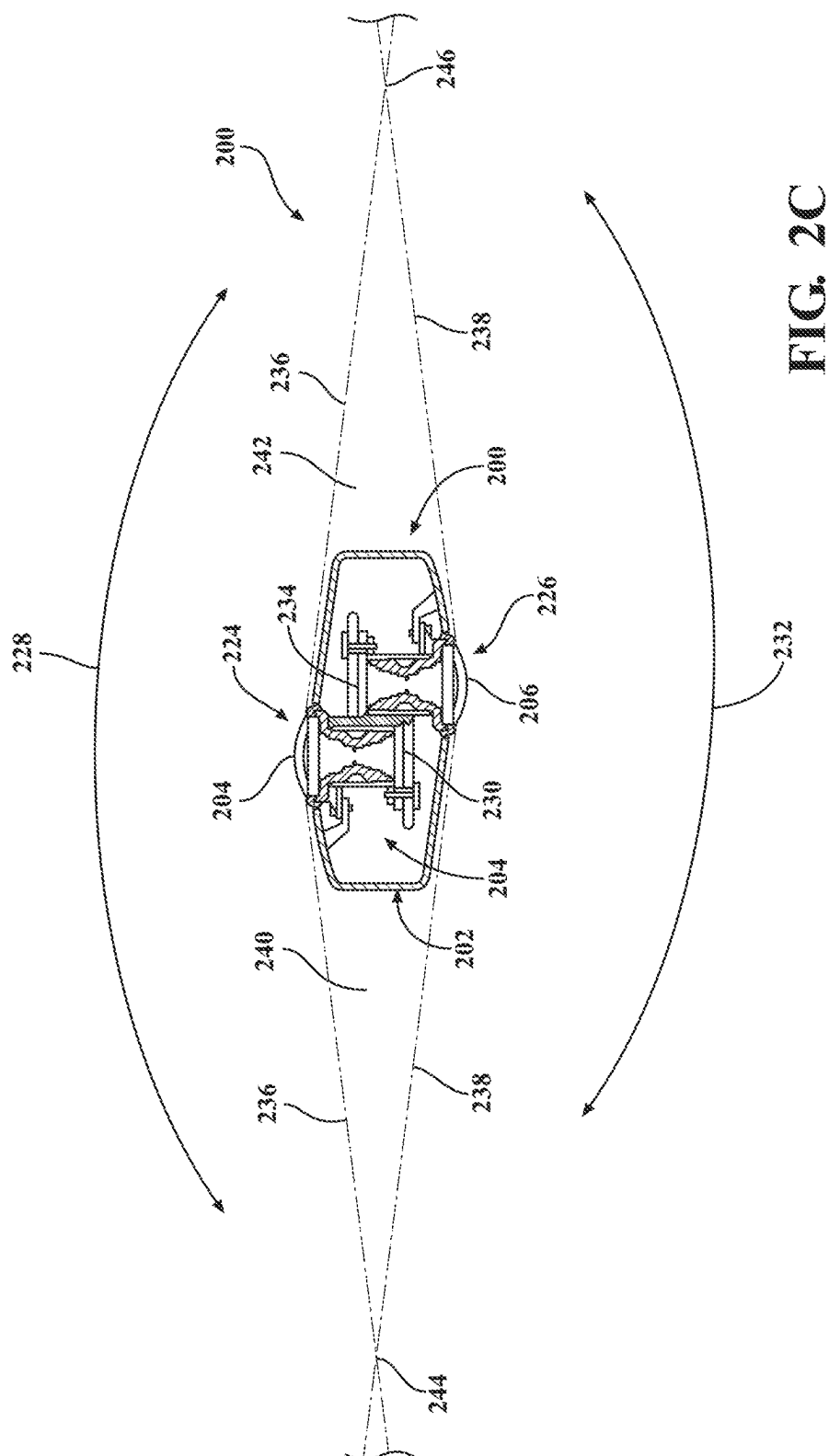


FIG. 2B





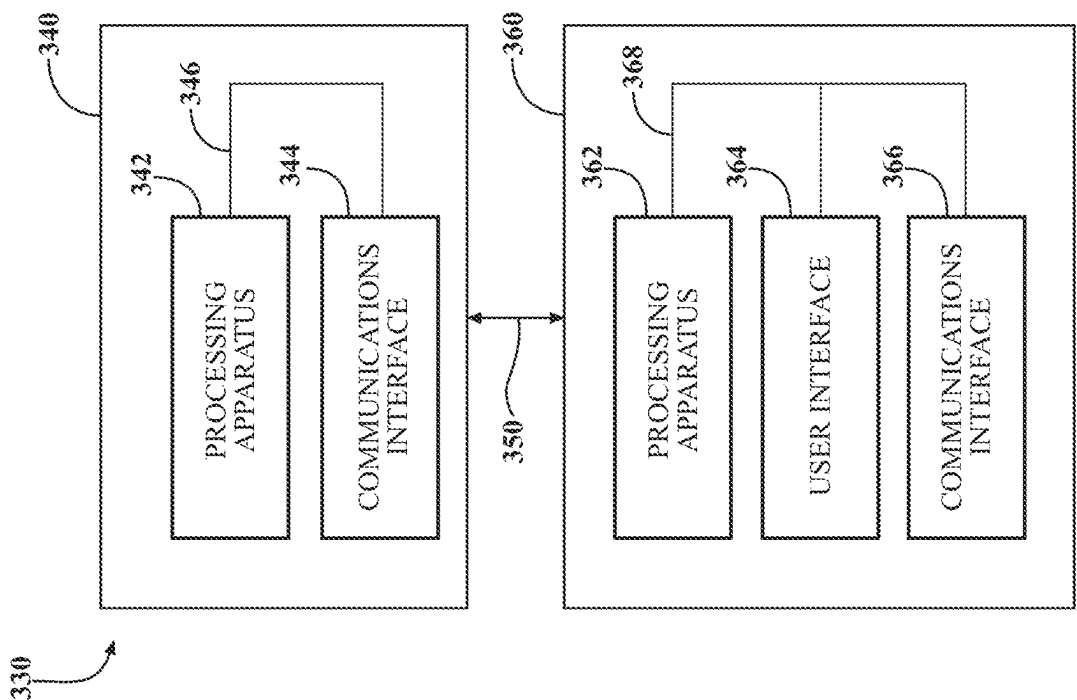


FIG. 3B

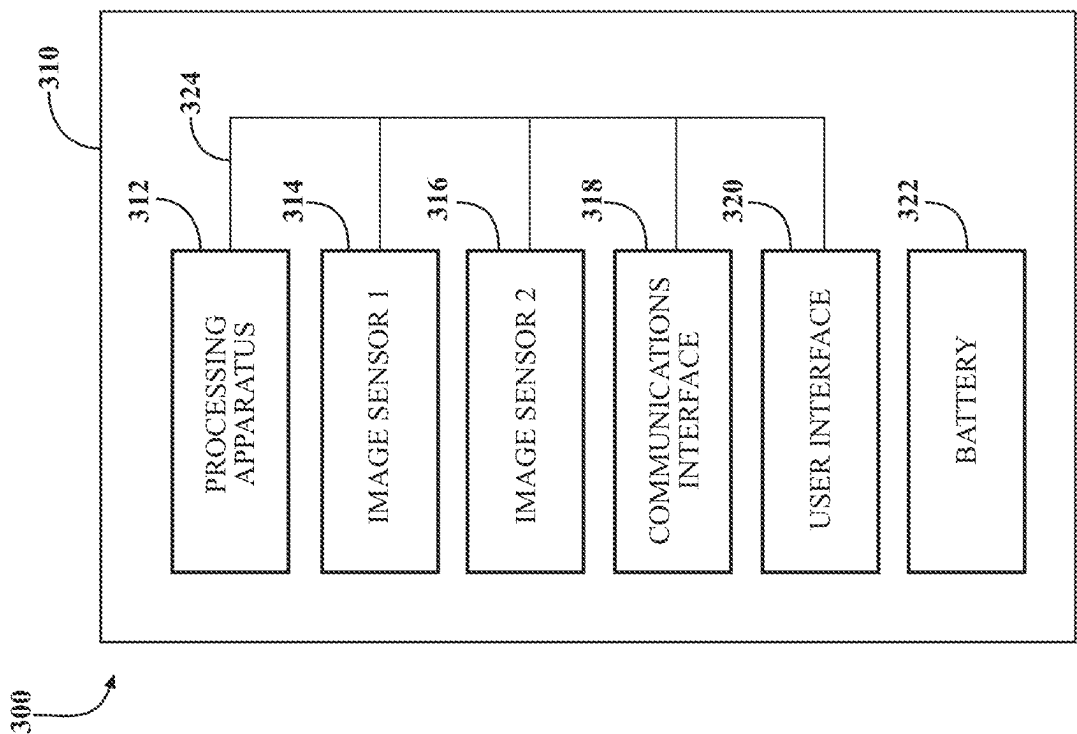


FIG. 3A

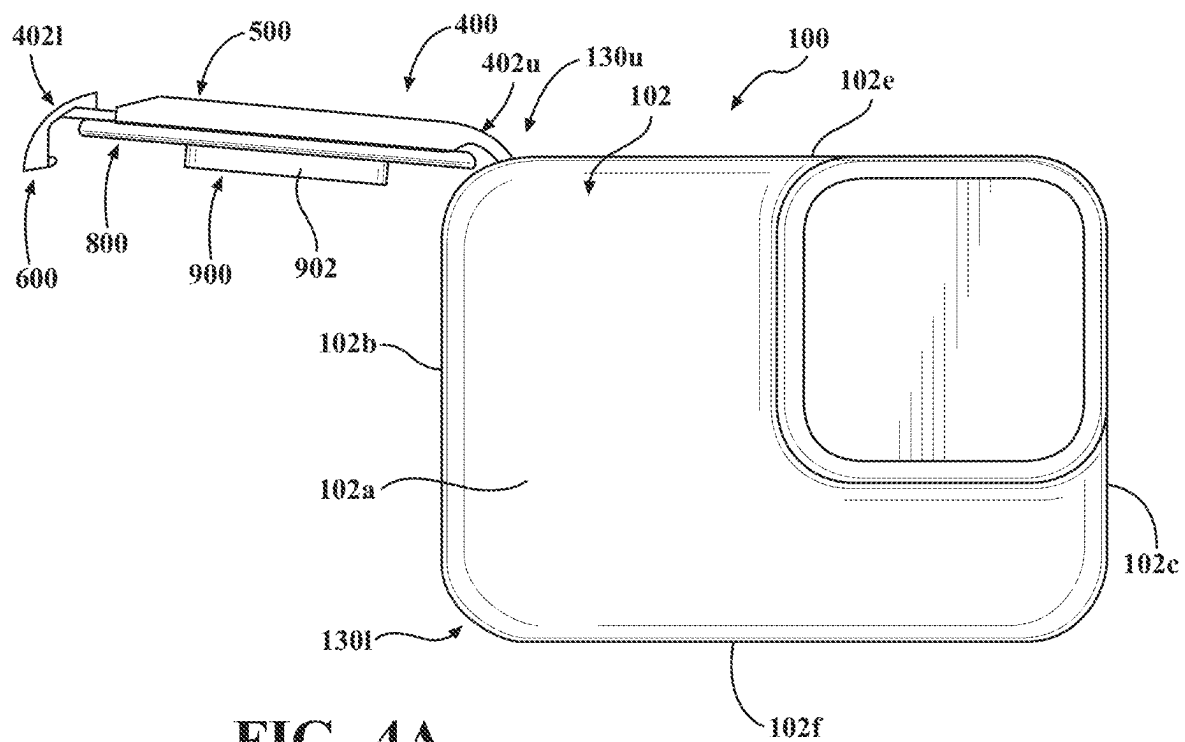


FIG. 4A

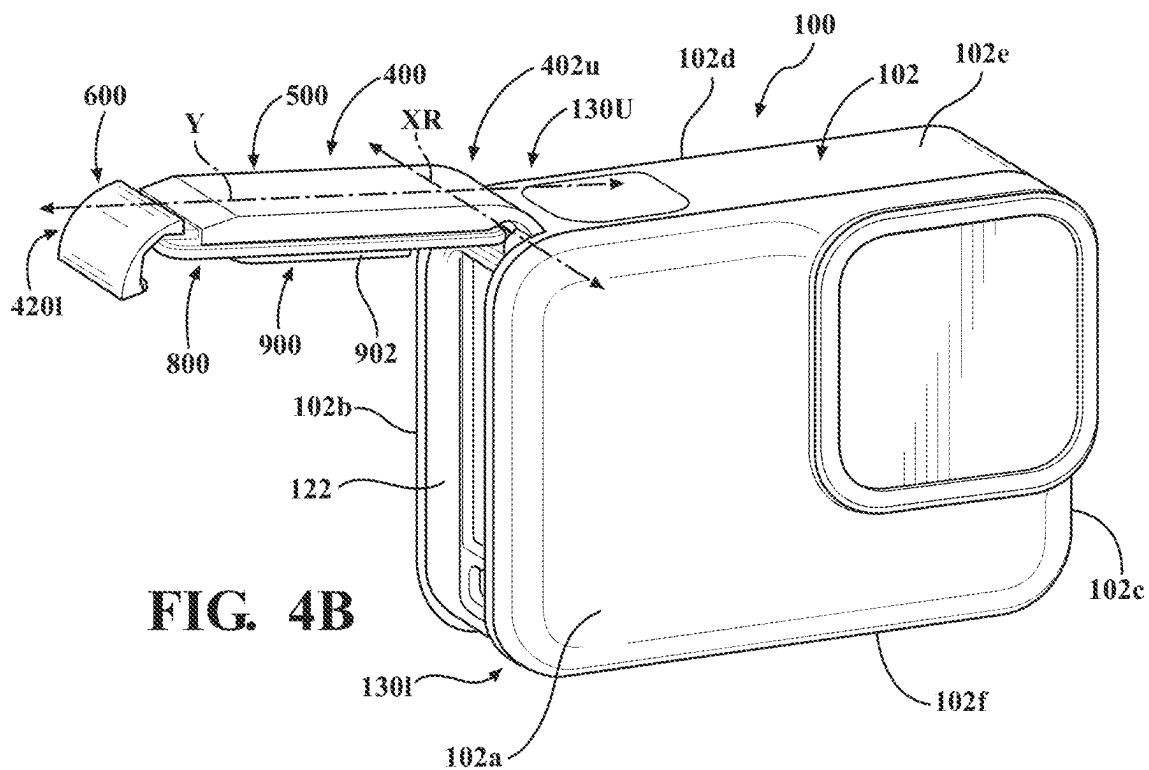


FIG. 4B



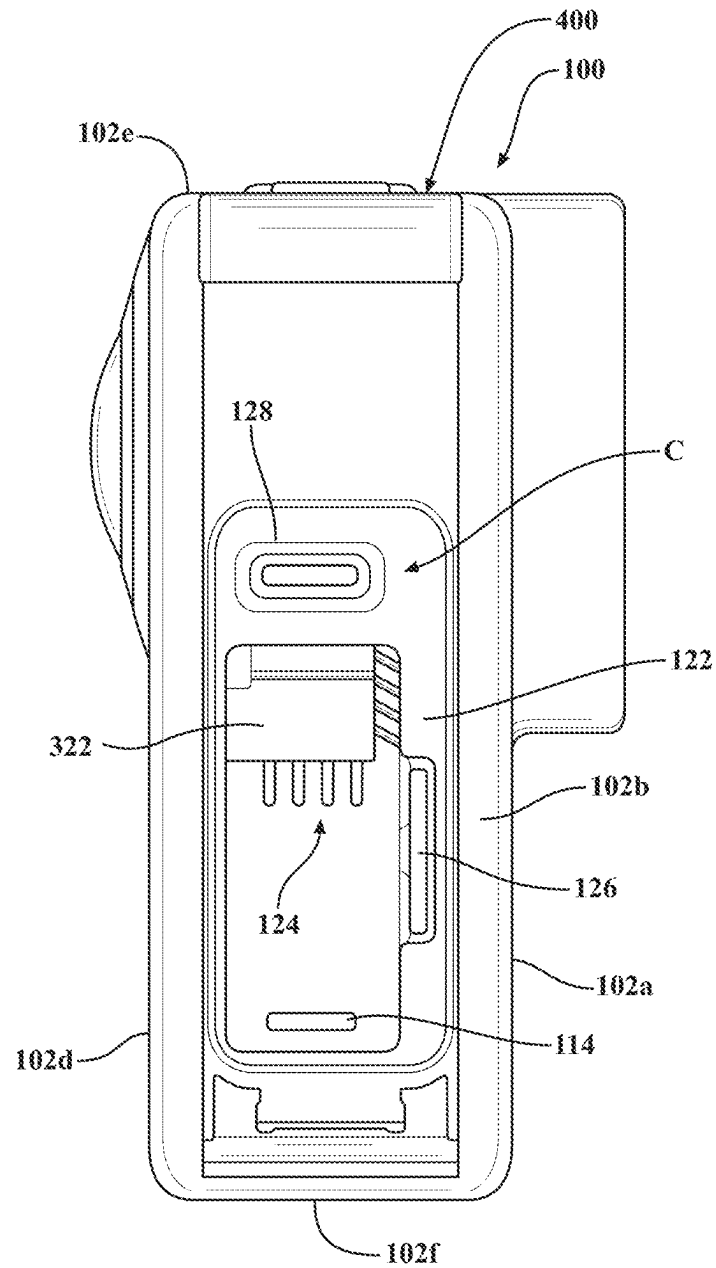
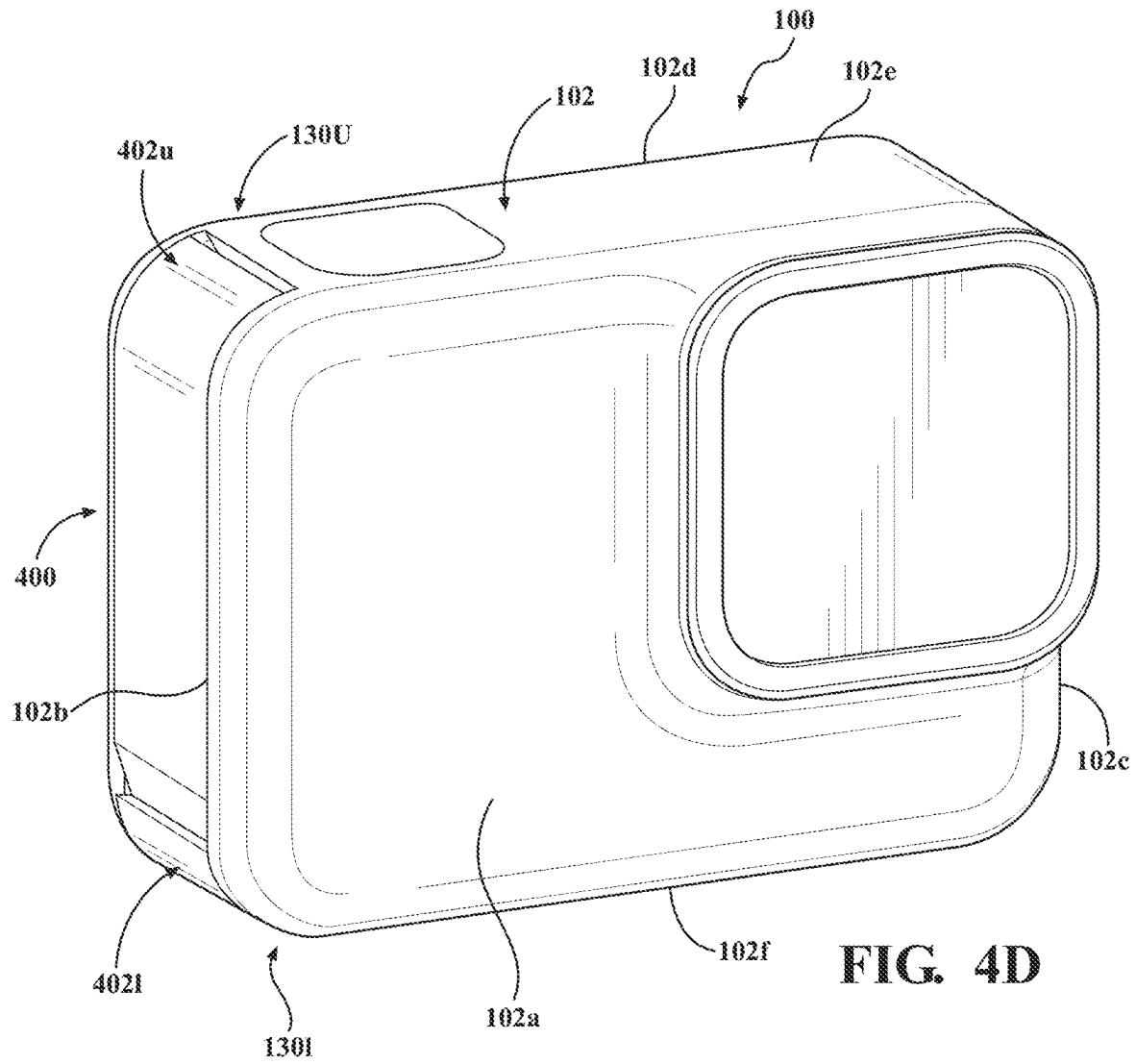
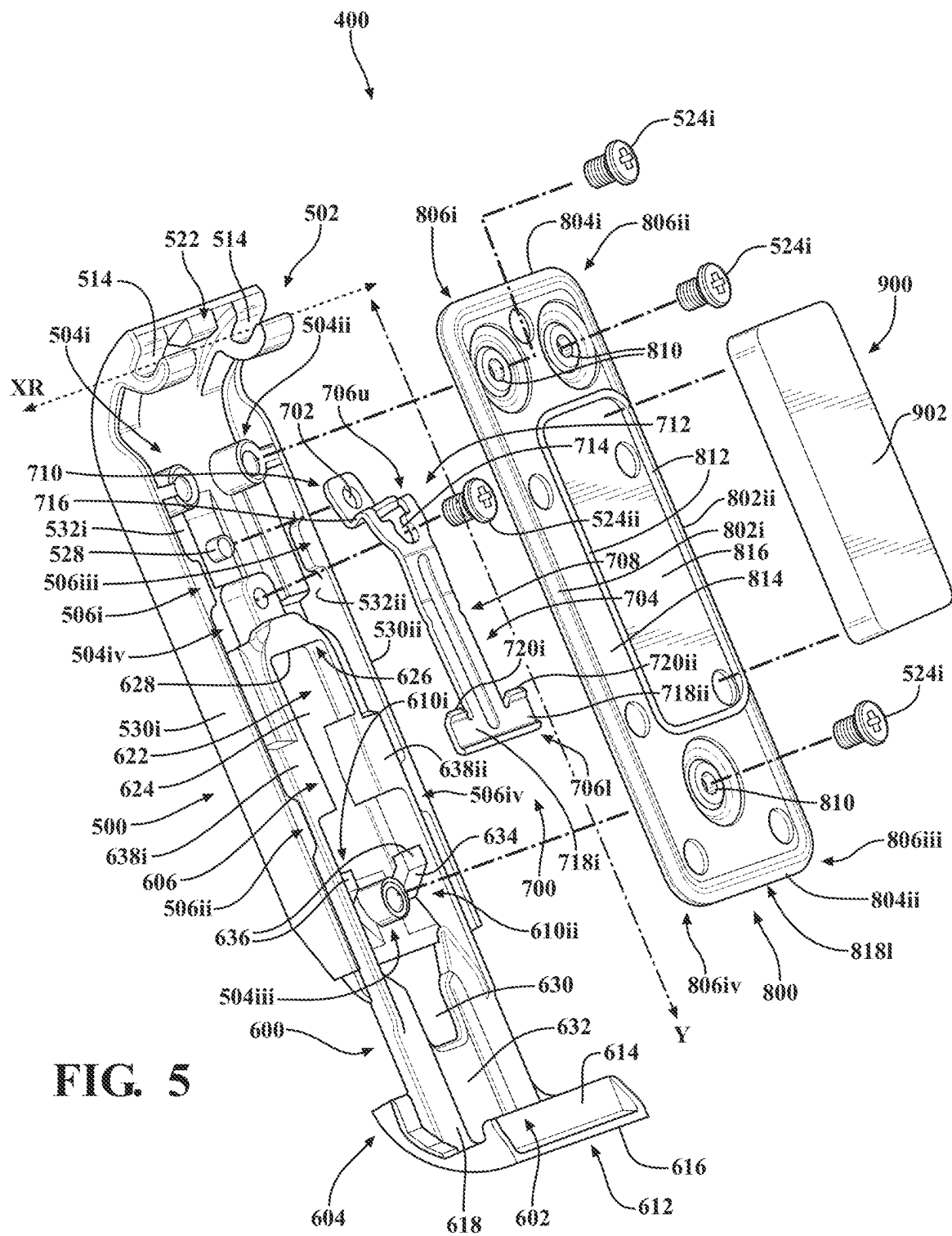
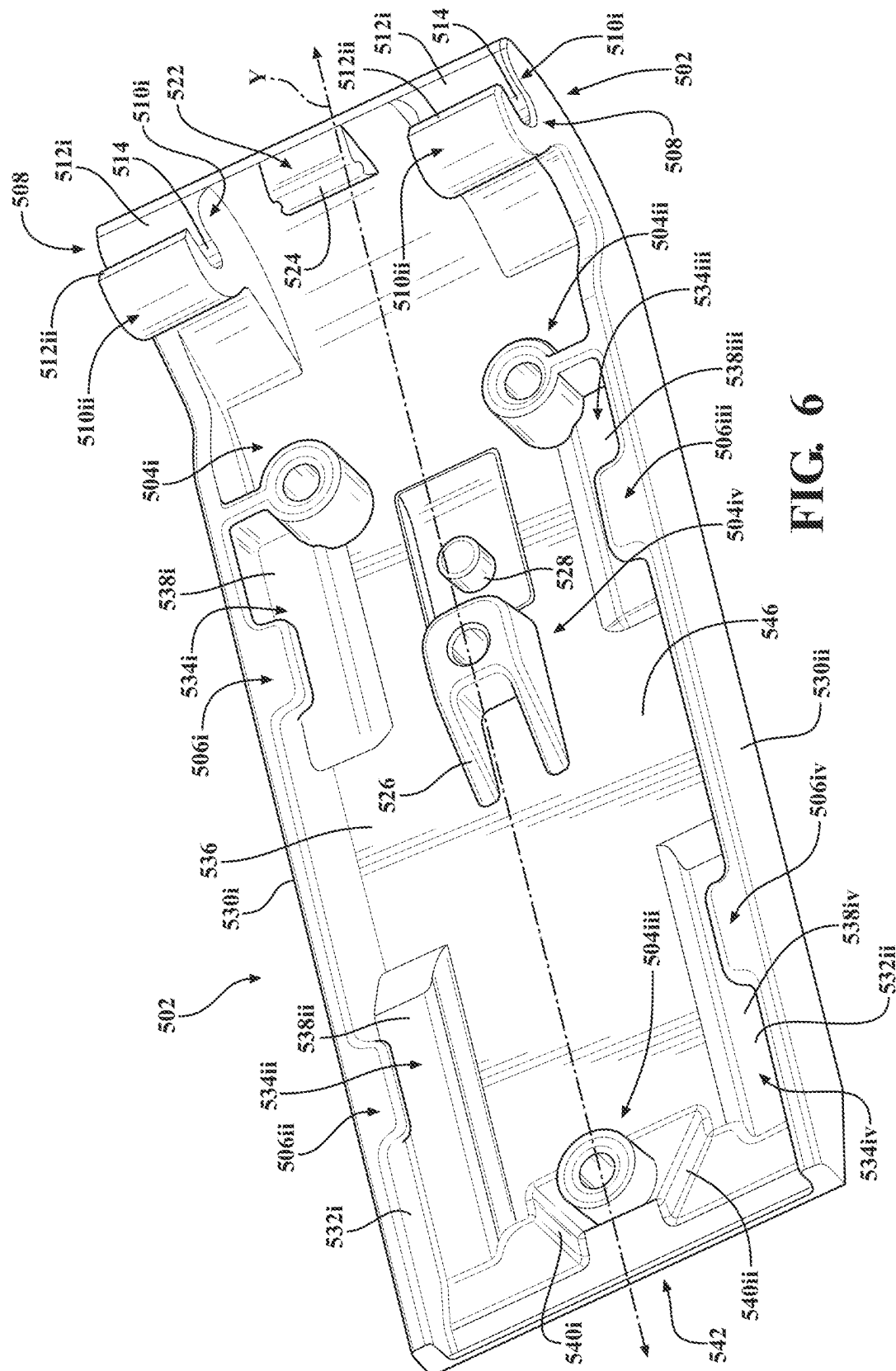


FIG. 4C



**FIG. 4D**





# GLI

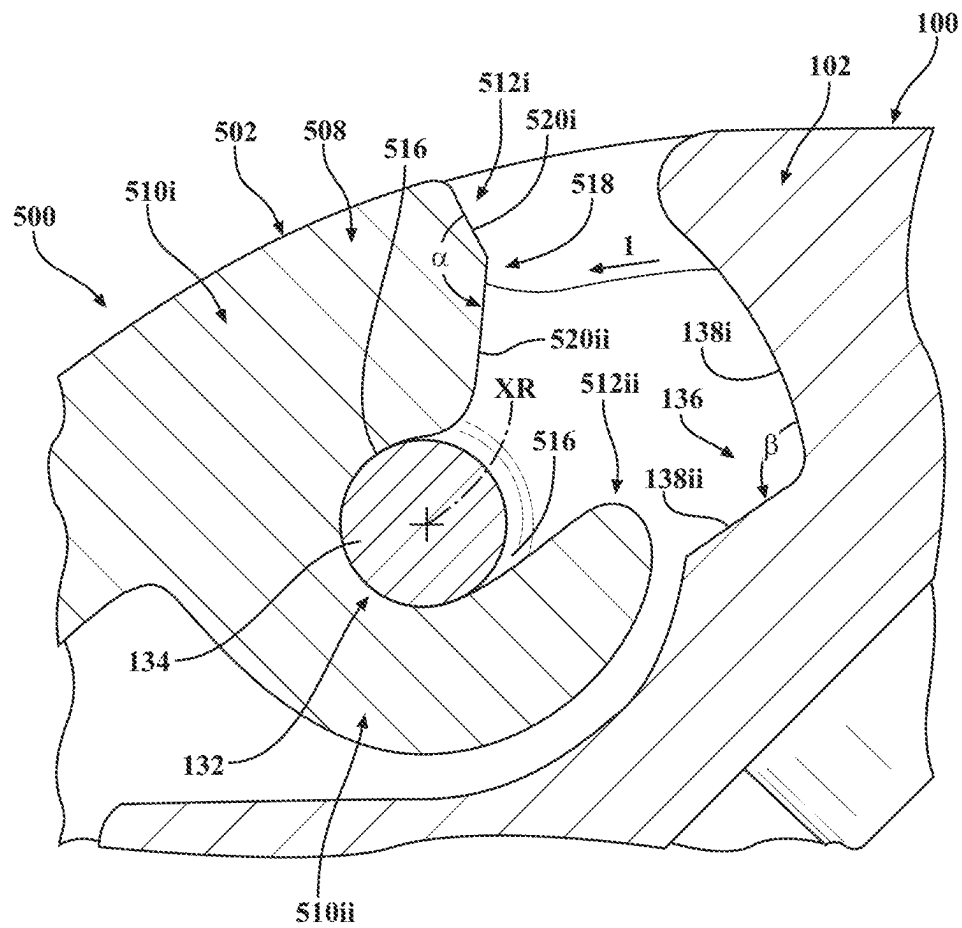


FIG. 7

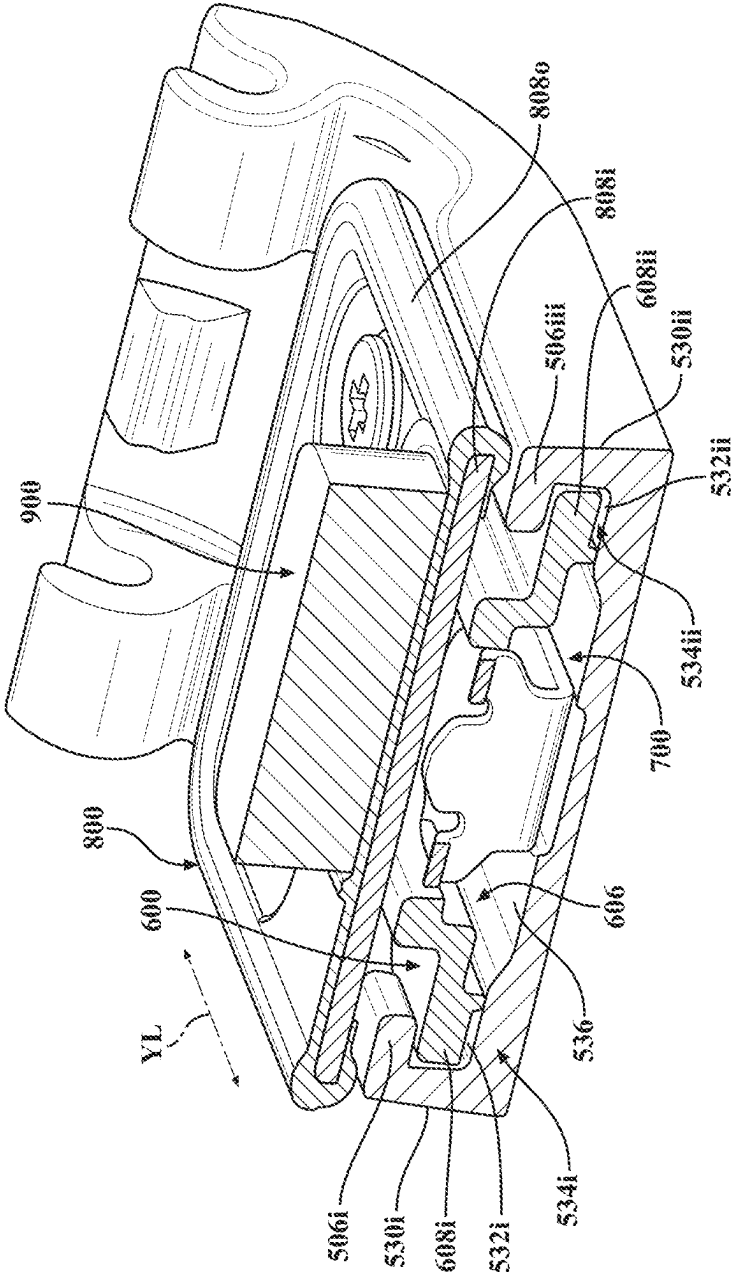


FIG. 8

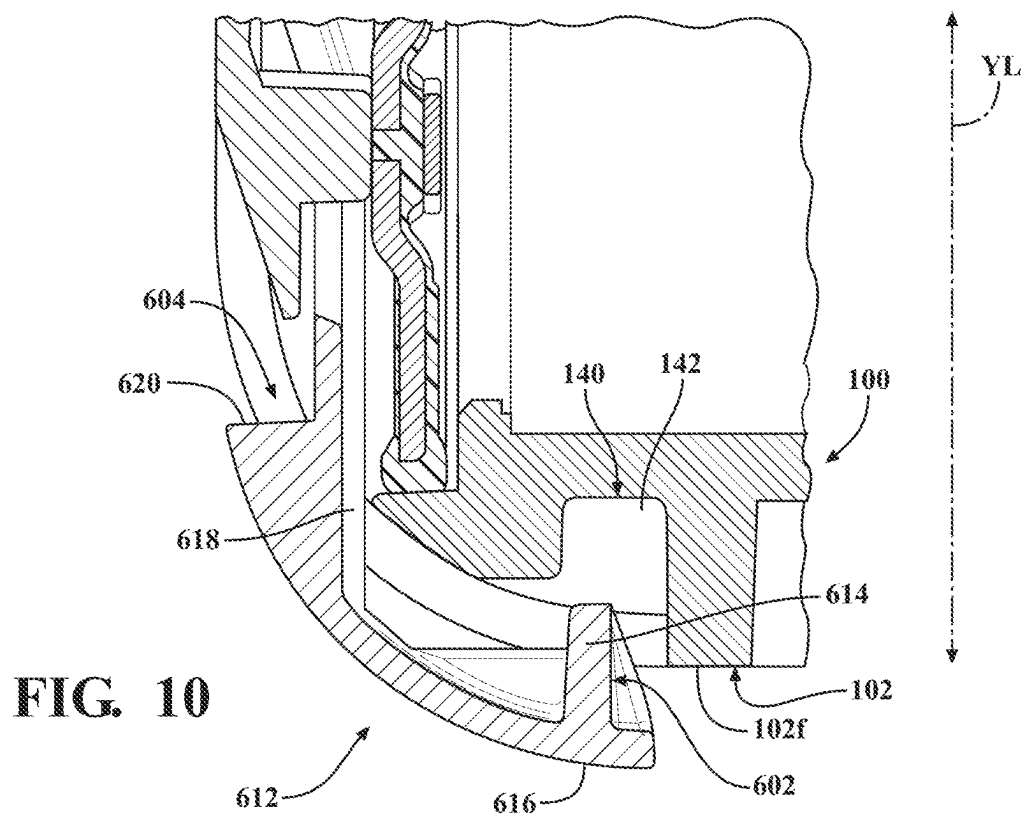
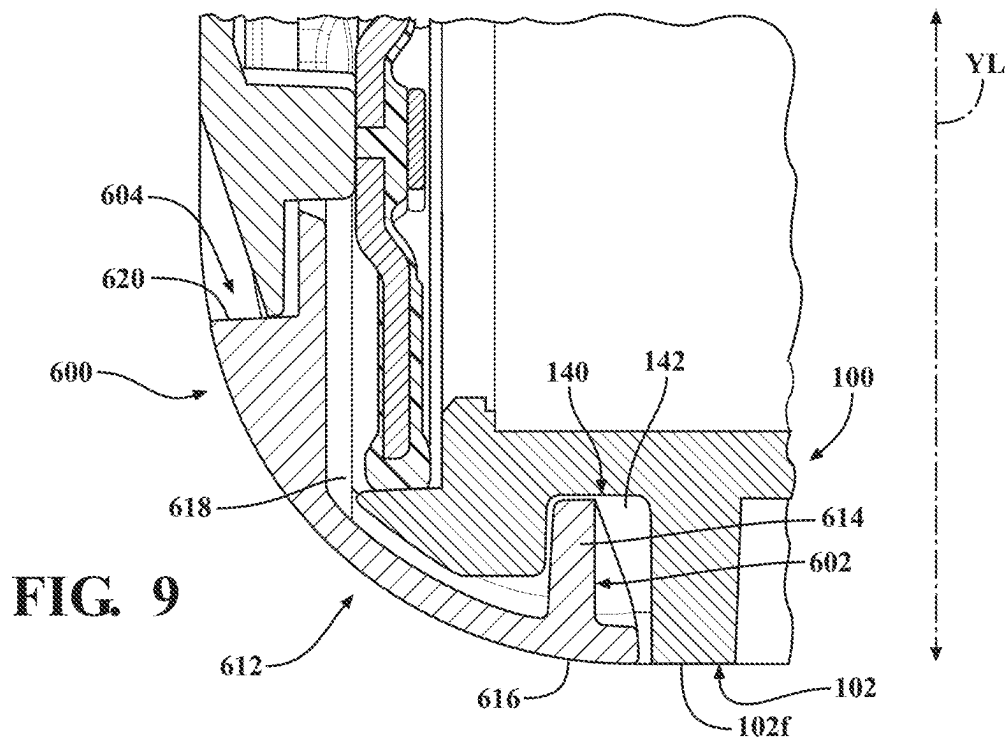


FIG. 11

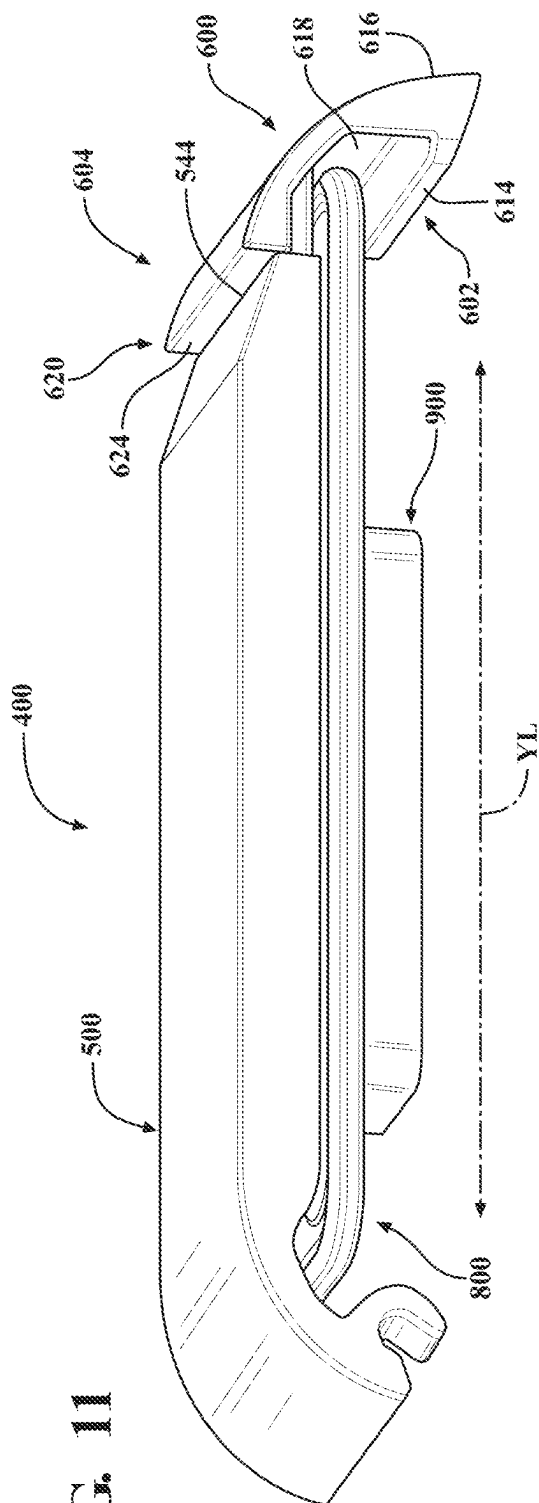
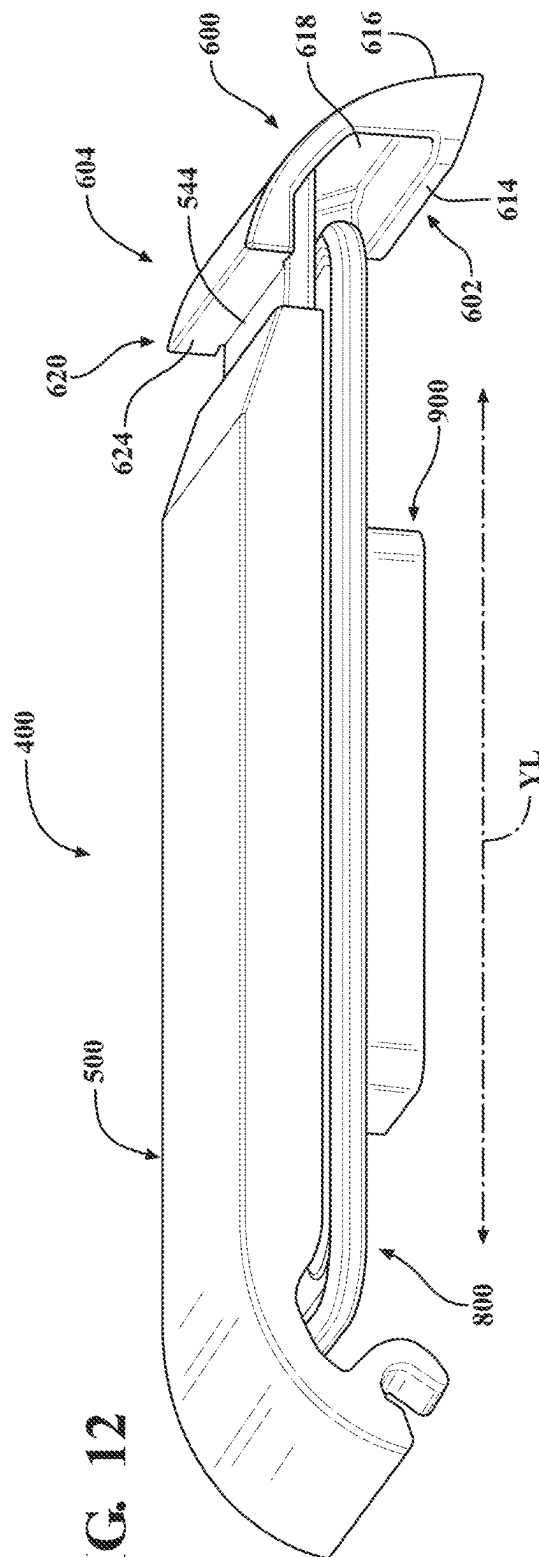
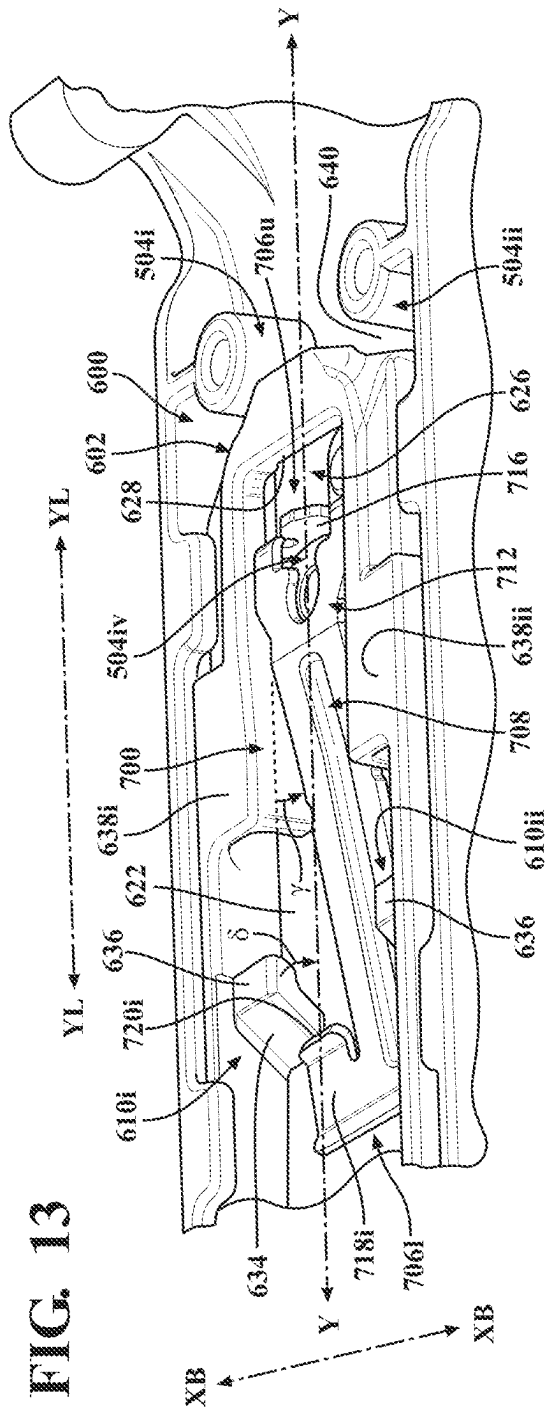


FIG. 12







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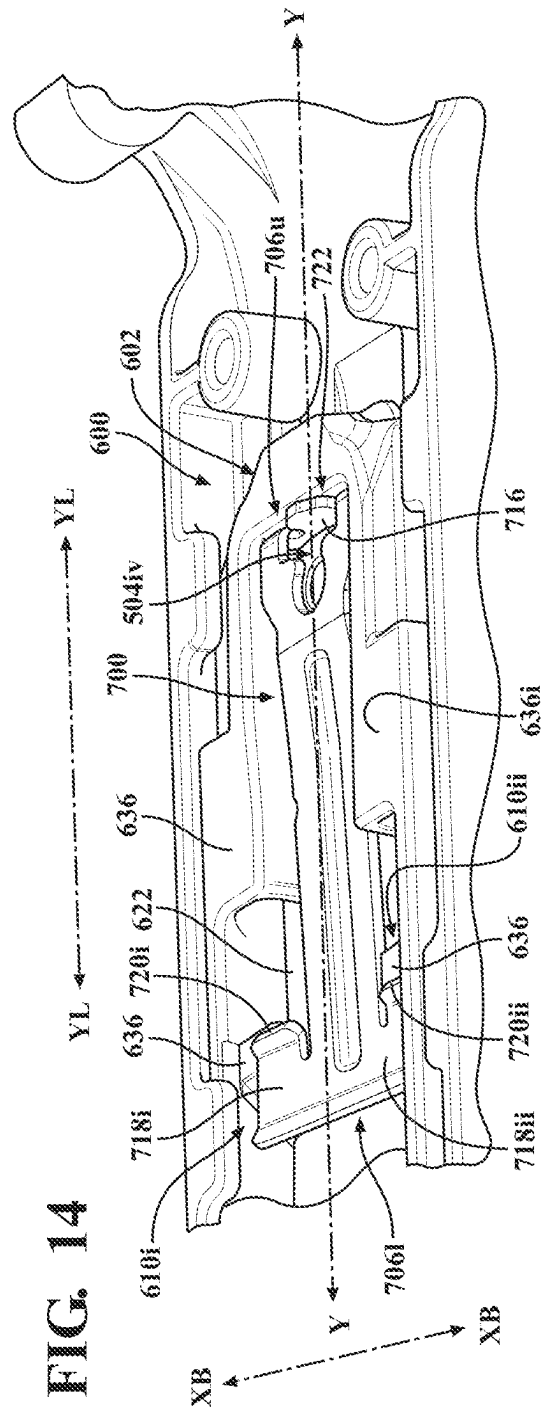


FIG 15

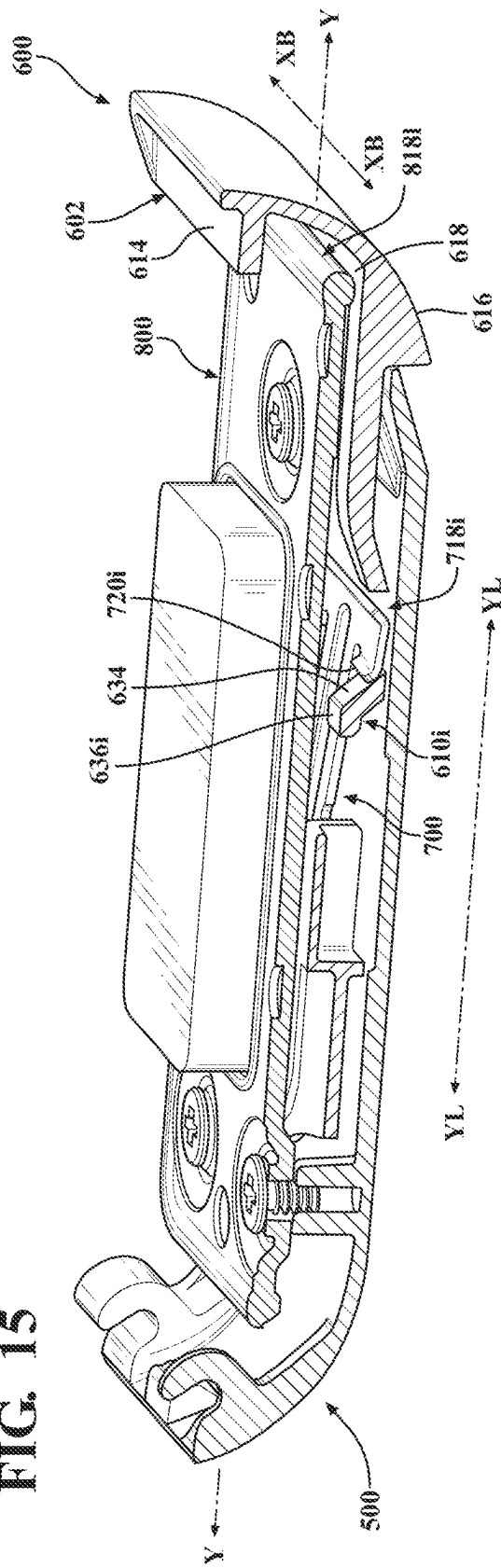
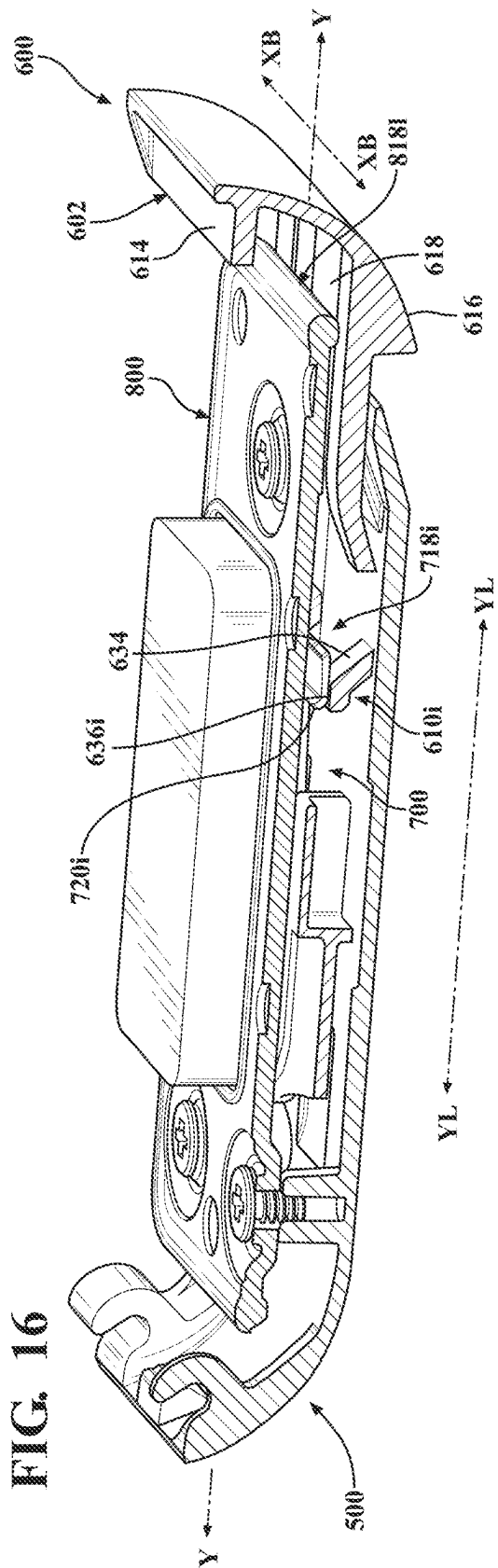


FIG. 16



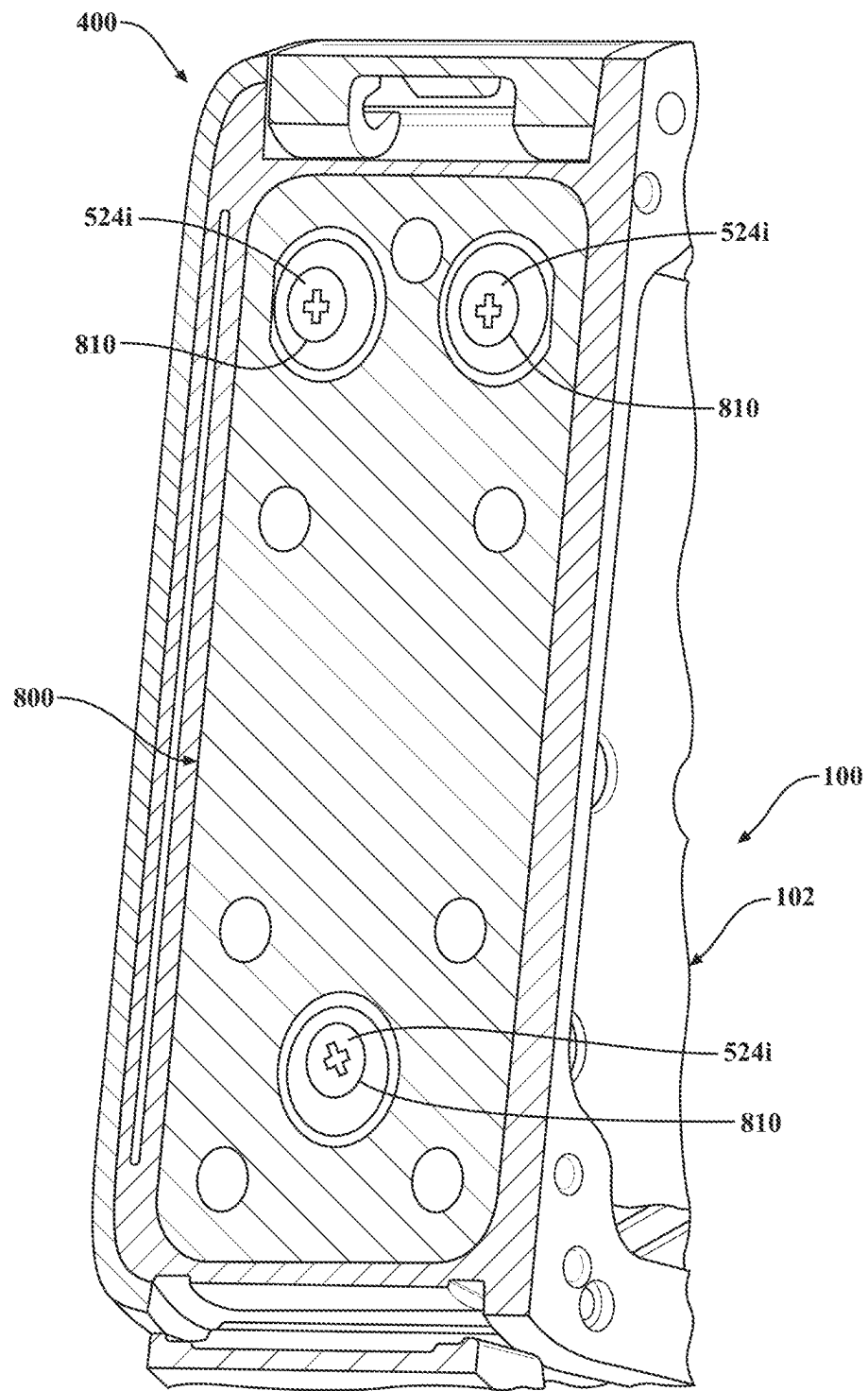
**FIG. 17**

FIG. 18

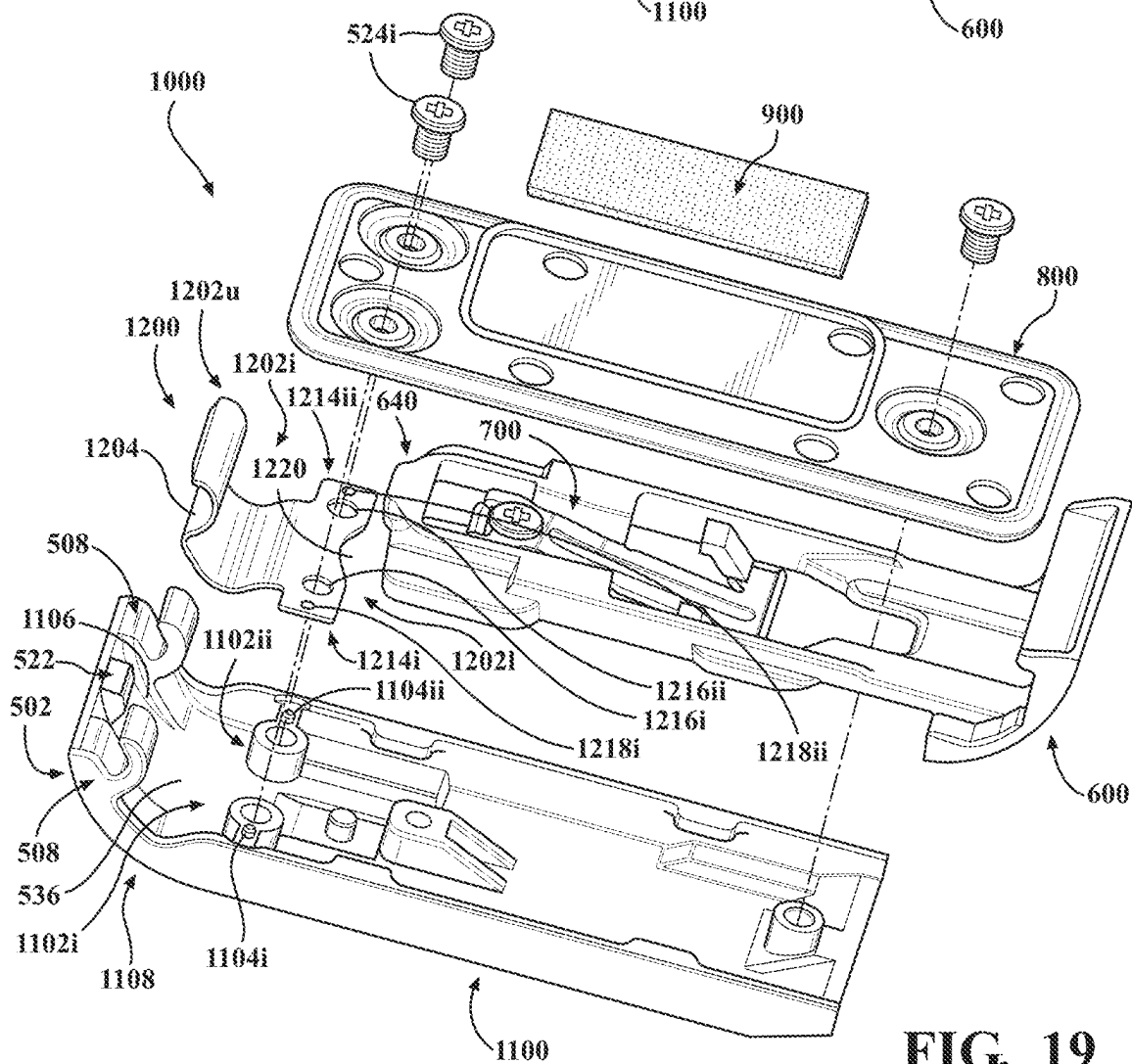
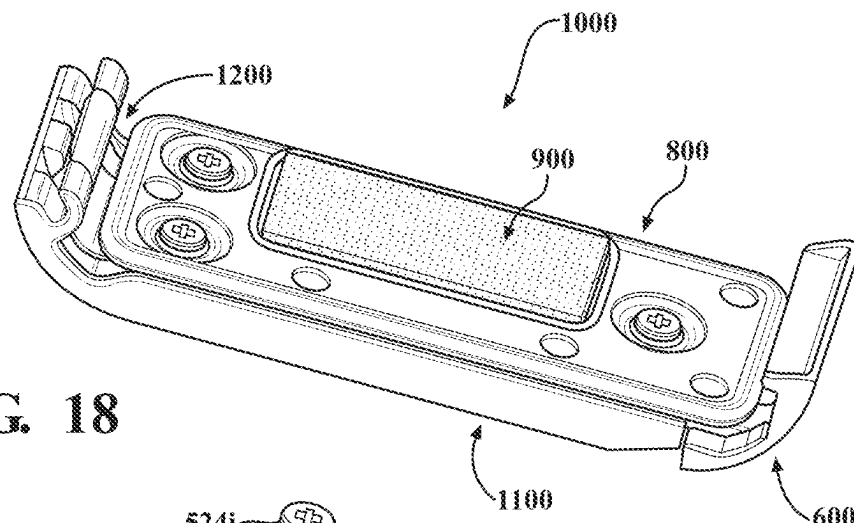


FIG. 19

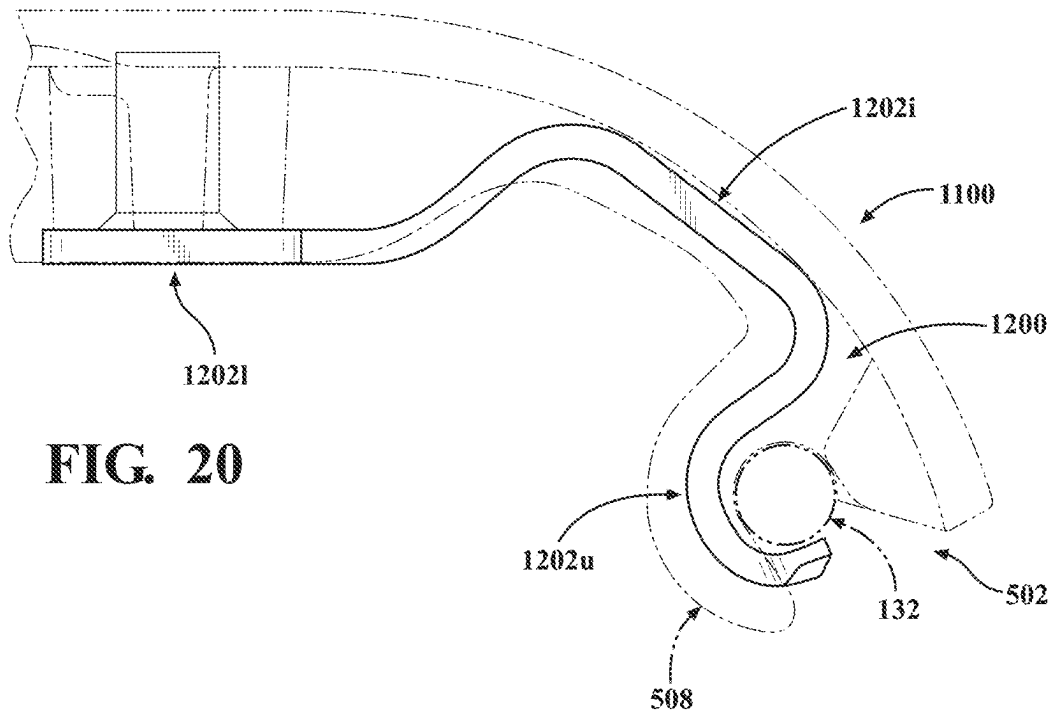


FIG. 20

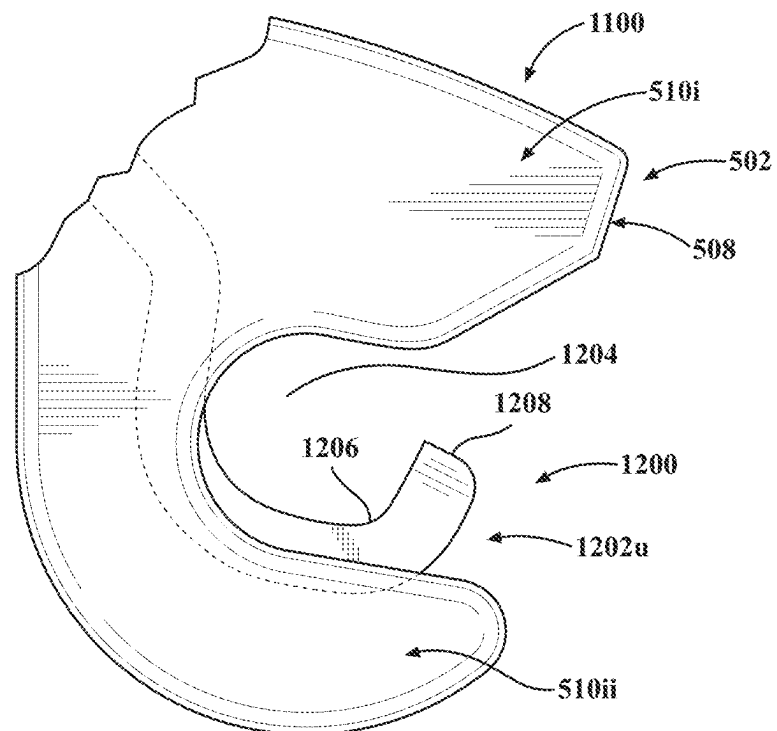
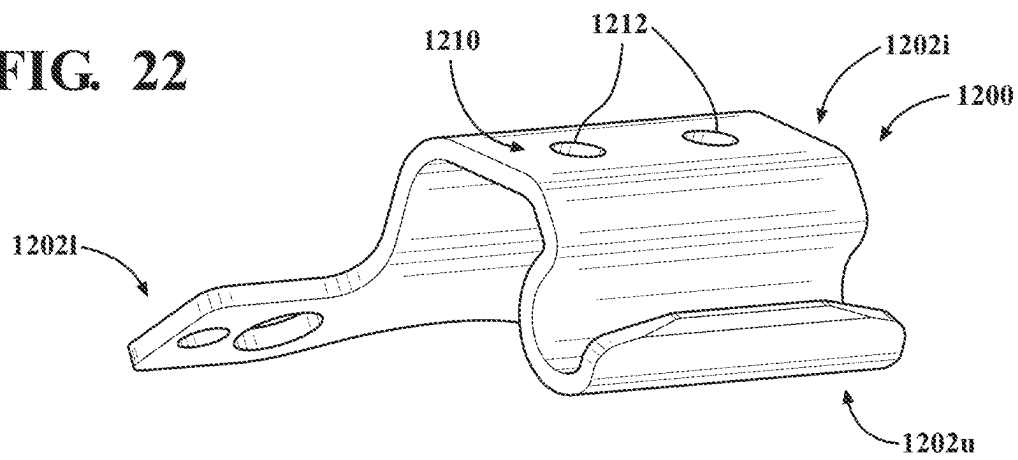


FIG. 21

**FIG. 22**



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**DOOR ASSEMBLIES FOR IMAGE CAPTURE DEVICES****CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a continuation of U.S. patent application Ser. No. 17/638,160, filed Feb. 24, 2022, which is a 371 of International Application No. PCT/US2020/050479, filed on Sep. 11, 2020, which claims priority to U.S. Provisional Application No. 62/901,953, filed on Sep. 18, 2019, the entire disclosures of which are hereby incorporated by reference.

**TECHNICAL FIELD**

The present disclosure relates generally to image capture devices, and, more specifically, to an image capture device including a removable door assembly that is repositionable between closed and open positions to conceal, protect, and expose interior components of the image capture device.

**BACKGROUND**

Image capture devices typically include a plurality of doors that are used to conceal various internal components, such as, for example, a power source for the image capture device (e.g., one or more batteries); one or more accessory ports; an I/O interface; USB-C connectors; etc. The inclusion of multiple doors, however, requires multiple seals (one for each door), and presents an elevated risk that water and/or debris may enter the image capture device. Additionally, in known image capture devices, the doors are often fixedly connected to (i.e., non-removable from) a body of the image capture device.

To address these concerns, the present disclosure describes image capture devices that include a single, removable door including an integrated sealing member.

**SUMMARY**

In one aspect of the present disclosure, an image capture device is disclosed that includes a body defining a peripheral cavity, and a door assembly that is configured to close and seal the peripheral cavity. The door assembly is movable (repositionable) between an open position and a closed position, and includes a door body with an engagement structure that is configured for removable connection to the body of the image capture device; a locking mechanism that is slidable in relation to the door body between a locked position and an unlocked position; and a biasing member that is configured for engagement with the locking mechanism to resist movement of the locking mechanism from the locked position to the unlocked position until a threshold force is applied to the locking mechanism. In the locked position, the door assembly is rotationally fixed in relation to the body of the image capture device to inhibit movement of the door assembly from the closed position to the open position, and in the unlocked position, the door assembly is rotatable in relation to the body of the image capture device to allow for movement of the door assembly from the closed position to the open position. The biasing member is configured for movement between a normal position and a deflected position upon the application of the threshold force. In the normal position, the biasing member extends at a first angle in relation to the locking mechanism, and in the

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deflected position, the biasing member extends at a second, greater angle in relation to the locking mechanism.

In certain embodiments, the biasing member may be configured for contact with the locking mechanism to define a range of relative motion between the locking mechanism and the door body. In certain embodiments, the locking mechanism may include a deflector that is configured for engagement with the biasing member such that the biasing member traverses the deflector during movement of the locking mechanism between the normal position and the deflected position. In certain embodiments, the deflector may define an angled surface that is configured to facilitate movement of the biasing member between the normal position and the deflected position. In certain embodiments, the biasing member may include a generally T-shaped configuration defining a first wing and a second wing. In certain embodiments, the deflector may include a first deflector that is configured for engagement with the first wing and a second deflector that is configured for engagement with the second wing. In certain embodiments, the engagement structure may be configured to rotatably connect and axially fix the door body to the body of the image capture device such that the door assembly is rotatable in relation to the body of the image capture device during movement between the open position and the closed position. In certain embodiments, the locking mechanism may include a locking member that is configured for engagement with a receptacle defined by the body of the image capture device. In certain embodiments, the locking member may be positioned within the receptacle when the locking mechanism is in the locked position and may be separated from the receptacle when the locking mechanism is in the unlocked position. In certain embodiments, the biasing member may extend in generally parallel relation to a longitudinal axis of the door assembly in the deflected position. In certain embodiments, the biasing member may be axially fixed to the door body such that the locking mechanism is slidable in relation to the biasing member during movement between the locked position and the unlocked position. In certain embodiments, the door assembly may further include a sealing member that is connected to the door body such that the locking mechanism and the biasing member are positioned between the door body and the sealing member. In certain embodiments, the sealing member may include a resilient material and may be positioned such that the sealing member is compressed within the peripheral cavity during movement of the door assembly from the open position to the closed position to form a seal between the door assembly and the body of the image capture device when the door assembly is in the closed position. In certain embodiments, the locking mechanism may include a tactile member that is configured for engagement by a user such that the locking mechanism is manually movable from the locked position to the unlocked position. In certain embodiments, the image capture device may further include one or more of a power source; an accessory port; an I/O interface; and a USB-C connector. In certain embodiments, the power source, the accessory port, the I/O interface, and/or the USB-C connector may be positioned for access via the peripheral cavity when the door assembly is in the open position. It is envisioned that the image capture device described above may include any combination of features and elements described in this paragraph.

In another aspect of the present disclosure, a door assembly is disclosed for an image capture device. The door assembly includes a door body that is configured for removable connection to the image capture device; a locking

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mechanism that is connected to the door body to lock and unlock the door assembly such that the door assembly is movable in relation to and is removable from the image capture device; a biasing member; and a sealing member. The locking mechanism is movable along an axis of movement that extends in generally parallel relation to a longitudinal axis of the door assembly. The biasing member is configured for engagement with the locking mechanism to resist movement of the locking mechanism until a threshold force is applied to the locking mechanism, whereupon the biasing member is movable from a first position to a second position along an axis of movement that extends in generally orthogonal relation to a longitudinal axis of the door assembly. The sealing member is configured to sealingly engage the image capture device upon closure of the door assembly and is secured to the door body such that the locking mechanism and the biasing member are positioned between the door body and the sealing member.

In certain embodiments, the locking mechanism may be movable between a first position, in which the door assembly is inhibited from rotating relative to the body of the image capture device, and a second position, in which the door assembly is freely rotatable in relation to the body of the image capture device. In certain embodiments, the locking mechanism may include a locking member that is configured for engagement with the image capture device when the locking mechanism is in the first position. In certain embodiments, the locking member may be disengageable from the image capture device as the locking mechanism moves from the first position to the second position. In certain embodiments, the biasing member may be configured such that the biasing member extends at a first angle in relation to the locking mechanism when the locking mechanism is in the first position and at a second, greater angle in relation to the locking mechanism when the locking mechanism is in the second position. In certain embodiments, the biasing member may be axially fixed to the door body such that the locking mechanism is movable in relation to the biasing member as the locking mechanism moves between the first position and the second position. It is envisioned that the door assembly described above may include any combination of features and elements described in this paragraph.

In another aspect of the present disclosure, a method of assembling an image capture device including a door assembly is disclosed. The method includes assembling a locking mechanism and a door body of the door assembly such that the locking mechanism is slidable in relation to the door body to lock and unlock the door assembly; axially fixing a biasing member to the door body such that the locking mechanism is positioned for contact with the biasing member, and such that the locking mechanism is slidable in relation to the biasing member upon application of a threshold force to the locking mechanism; connecting a sealing member to the door body such that the locking mechanism and the biasing member are positioned between the door body and the sealing member, and such that the sealing member sealingly engages a body of the image capture device upon closure of the door assembly; and removably connecting the door assembly to a body of the image capture device such that the door assembly is rotatable in relation to the body of the image capture device, and such that a locking member defined by the locking mechanism is movable into, and out of, a corresponding receptacle defined by the body of the image capture device during locking and unlocking of the door assembly.

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In certain embodiments, assembling the locking mechanism and the door body may include positioning the locking mechanism such that the locking mechanism is slidable in relation to the door body along an axis of movement that extends in generally parallel relation to a longitudinal axis of the door assembly. In certain embodiments, axially fixing the biasing member to the door body may include connecting the biasing member to the door body such that the biasing member is deflectable along an axis of movement that extends in generally orthogonal relation to the longitudinal axis of the door assembly upon application of the threshold force. It is envisioned that the method described above may include any combination of features, elements, and/or tasks described in this paragraph.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure is best understood from the following detailed description when read in conjunction with the accompanying drawings. It is emphasized that, according to common practice, the various features of the drawings are not to scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity.

FIGS. 1A-1D are isometric views of an example of an image capture device.

FIGS. 2A-2B are isometric views of another example of an image capture device.

FIG. 2C is a cross-sectional view of the image capture device of FIGS. 2A-2B.

FIGS. 3A-3B are block diagrams of examples of image capture systems.

FIG. 4A is a front, plan view of the image capture device including a door assembly according to the principles of the present disclosure shown in an open position.

FIG. 4B is a front, perspective view of the image capture device with the door assembly shown in the open position.

FIG. 4C is a side, plan view of the image capture device with the door assembly shown in the open position.

FIG. 4D is a front, perspective view of the image capture device with the door assembly shown in a closed position.

FIG. 5 is a perspective view of the door assembly shown separated from the image capture device with parts separated, which includes a door body; a locking mechanism; a biasing member; a sealing member; and a spacer.

FIG. 6 is a bottom, perspective view of the door body.

FIG. 7 is a partial, (vertical) cross-sectional view of the door body shown connected to the image capture device via a pivot member.

FIG. 8 is a (horizontal) cross-sectional view of the door assembly.

FIG. 9 is a partial, (vertical) cross-sectional view showing the locking mechanism in a locked position.

FIG. 10 is a partial, (vertical) cross-sectional view showing the locking mechanism in an unlocked position.

FIG. 11 is a side, perspective view of the door assembly with the locking mechanism shown in the locked position.

FIG. 12 is a side, perspective view of the door assembly with the locking mechanism shown in the unlocked position.

FIG. 13 is a partial, top, perspective view of the door assembly (with the sealing member and the spacer removed) showing the locking mechanism in the locked position.

FIG. 14 is a partial, top, perspective view of the door assembly (with the sealing member and the spacer removed) showing the locking mechanism in the unlocked position.

FIG. 15 is a side, (vertical) cross-sectional view of the door assembly with the locking mechanism shown in the locked position.



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FIG. 16 is a side, (vertical) cross-sectional view of the door assembly with the locking mechanism shown in the unlocked position.

FIG. 17 is a partial, (vertical) cross-sectional view of the door assembly shown connected to the image capture device.

FIG. 18 is a perspective view of an alternate embodiment of the door assembly, which includes a door body; the locking mechanism, the biasing member, the sealing member, and the spacer seen in FIGS. 4A-17; and a clip.

FIG. 19 is a perspective view of the door assembly seen in FIG. 18 with parts separated.

FIG. 20 is a side, plan view illustrating connection of the clip to the door body (shown in phantom).

FIG. 21 is a side, plan view illustrating connection of the clip to the door body according to an alternate embodiment of the disclosure.

FIG. 22 is a perspective view of the clip according to an alternate embodiment of the disclosure.

#### DETAILED DESCRIPTION

The present disclosure describes image capture devices and various embodiments of door assemblies for use therewith. The door assemblies described herein are configured for removable connection to an image capture device, and are movable between open and closed positions to conceal and permit access to various internal components of the image capture device, including, for example, a power source (e.g., one or more batteries); one or more accessory ports; an I/O interface; USB-C connectors; etc. To guard against (if not entirely prevent) the entry of debris and/or water, the door assemblies described herein include a sealing member that is configured to form a (waterproof) seal with a body of the image capture device upon closure.

In addition to the sealing member, the door assemblies described herein include a locking mechanism that is movable (e.g., slidable) between locked and unlocked positions; a biasing member (e.g., a spring clip); a spacer; and a door body that supports the various components of the door assembly.

In the locked position, the locking mechanism engages the body of the image capture device to inhibit opening of the door assembly, and in the unlocked position, the locking mechanism is disengaged from the body of the image capture device to permit opening of the door assembly. The biasing member, however, acts upon the locking mechanism such that the locking mechanism remains in the locked position until the application of a threshold force thereto, thereby inhibiting (if not entirely preventing) inadvertent (e.g., accidental or unwanted) movement of the locking mechanism into the unlocked position (e.g., in the event that the image capture device is dropped), and, thus, inadvertent (e.g., accidental or unwanted) opening of the door assembly.

The spacer is supported by (e.g., is secured to) the sealing member to reduce (if not entirely eliminate) undesirable relative movement between the components of the door assembly. Additionally, or alternatively, the spacer may enhance the seal formed between the sealing member and the image capture device upon closure of the door assembly; increase shock absorption; and/or enhance electrical connectivity between the components of the image capture device.

FIGS. 1A-1D are isometric views of an example of an image capture device 100. The image capture device 100 may include a body 102 having a lens 104 structured on a front surface of the body 102, various indicators on the front

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surface of the body 102 (such as LEDs, displays, and the like), various input mechanisms (such as buttons, switches, and touchscreen mechanisms), and electronics (e.g., imaging electronics, power electronics, etc.) internal to the body 102 for capturing images via the lens 104 and/or performing other functions. The image capture device 100 may be configured to capture images and video and to store captured images and video for subsequent display or playback.

The image capture device 100 may include various indicators, including LED lights 106 and an LCD display 108. The image capture device 100 may also include buttons 110 configured to allow a user of the image capture device 100 to interact with the image capture device 100, to turn the image capture device 100 on, to operate latches or hinges associated with doors of the image capture device 100, and/or to otherwise configure the operating mode of the image capture device 100. The image capture device 100 may also include a microphone 112 configured to receive and record audio signals in conjunction with recording video.

The image capture device 100 may include an I/O interface 114 (e.g., hidden as indicated using dotted lines). As best shown in FIG. 1B, the I/O interface 114 can be covered and sealed by a removable door 115 of the image capture device 100. The removable door 115 can be secured, for example, using a latch mechanism 115a (e.g., hidden as indicated using dotted lines) that is opened by engaging the associated button 110 as shown.

The removable door 115 can also be secured to the image capture device 100 using a hinge mechanism 115b, allowing the removable door 115 to rotate (e.g., pivot) between an open position allowing access to the I/O interface 114 and a closed position blocking access to the I/O interface 114. The removable door 115 can also have a removed position (not shown) where the entire removable door 115 is separated from the image capture device 100, that is, where both the latch mechanism 115a and the hinge mechanism 115b allow the removable door 115 to be removed from the image capture device 100.

The image capture device 100 may also include another microphone 116 integrated into the body 102. The front surface of the image capture device 100 may include two drainage ports as part of a drainage channel 118. The image capture device 100 may include an interactive display 120 that allows for interaction with the image capture device 100 while simultaneously displaying information on a surface of the image capture device 100. As illustrated, the image capture device 100 may include the lens 104 that is configured to receive light incident upon the lens 104 and to direct received light onto an image sensor internal to the lens 104.

The image capture device 100 of FIGS. 1A-1D includes an exterior that encompasses and protects internal electronics. In the present example, the exterior includes six surfaces (i.e., a front face 102a, side (left and right) faces 102b, 102c, a back face 102d, a top face 102e, and a bottom face 102f) that form a rectangular cuboid. Furthermore, both the front and rear surfaces of the image capture device 100 are rectangular. In other embodiments, the exterior may have a different shape. The image capture device 100 may be made of a rigid material such as plastic, aluminum, steel, or fiberglass. The image capture device 100 may include features other than those described herein. For example, the image capture device 100 may include additional buttons or different interface features, such as interchangeable lenses, cold shoes and hot shoes that can add functional features to the image capture device 100, etc.

The image capture device **100** may include various types of image sensors, such as charge-coupled device (CCD) sensors, active pixel sensors (APS), complementary metal-oxide-semiconductor (CMOS) sensors, N-type metal-oxide-semiconductor (NMOS) sensors, and/or any other image sensor or combination of image sensors.

Although not illustrated, in various embodiments, the image capture device **100** may include other additional electrical components (e.g., an image processor, camera SoC (system-on-chip), etc.), which may be included on one or more circuit boards within the body **102** of the image capture device **100**.

The image capture device **100** may interface with or communicate with an external device, such as an external user interface device, via a wired or wireless computing communication link (e.g., the I/O interface **114**). The user interface device may, for example, be the personal computing device **360** described below with respect to FIG. **3B**. Any number of computing communication links may be used. The computing communication link may be a direct computing communication link or an indirect computing communication link, such as a link including another device, or a network, such as the Internet, may be used.

In some implementations, the computing communication link may be a Wi-Fi link, an infrared link, a Bluetooth (BT) link, a cellular link, a ZigBee link, a near-field communications (NFC) link (such as an ISO/IEC 20643 protocol link), an Advanced Network Technology interoperability (ANT+) link, and/or any other wireless communications link or combination of links.

In some implementations, the computing communication link may be an HDMI link, a USB link, a digital video interface link, a display port interface link (such as a Video Electronics Standards Association (VESA) digital display interface link), an Ethernet link, a Thunderbolt link, and/or other wired computing communication link.

The image capture device **100** may transmit images, such as panoramic images, or portions thereof, to the user interface device (not shown) via the computing communication link, and the user interface device may store, process, display, or a combination thereof the panoramic images.

The user interface device may be a computing device, such as a smartphone, a tablet computer, a phablet, a smart watch, a portable computer, and/or another device or combination of devices configured to receive user input, communicate information with the image capture device **100** via the computing communication link, or receive user input and communicate information with the image capture device **100** via the computing communication link.

The user interface device may display, or otherwise present, content, such as images or video, acquired by the image capture device **100**. For example, a display of the user interface device may be a viewport into the three-dimensional space represented by the panoramic images or video captured or created by the image capture device **100**.

The user interface device may communicate information, such as metadata, to the image capture device **100**. For example, the user interface device may send orientation information of the user interface device with respect to a defined coordinate system to the image capture device **100**, such that the image capture device **100** may determine an orientation of the user interface device relative to the image capture device **100**.

Based on the determined orientation, the image capture device **100** may identify a portion of the panoramic images or video captured by the image capture device **100** for the image capture device **100** to send to the user interface device

for presentation as the viewport. In some implementations, based on the determined orientation, the image capture device **100** may determine the location of the user interface device and/or the dimensions for viewing of a portion of the panoramic images or video.

The user interface device may implement or execute one or more applications to manage or control the image capture device **100**. For example, the user interface device may include an application for controlling camera configuration, video acquisition, video display, or any other configurable or controllable aspect of the image capture device **100**.

The user interface device, such as via an application, may generate and share, such as via a cloud-based or social media service, one or more images, or short video clips, such as in response to user input. In some implementations, the user interface device, such as via an application, may remotely control the image capture device **100**, such as in response to user input.

The user interface device, such as via an application, may display unprocessed or minimally processed images or video captured by the image capture device **100** contemporaneously with capturing the images or video by the image capture device **100**, such as for shot framing, which may be referred to herein as a live preview, and which may be performed in response to user input. In some implementations, the user interface device, such as via an application, may mark one or more key moments contemporaneously with capturing the images or video by the image capture device **100**, such as with a tag, such as in response to user input.

The user interface device, such as via an application, may display, or otherwise present, marks or tags associated with images or video, such as in response to user input. For example, marks may be presented in a camera roll application for location review and/or playback of video highlights.

The user interface device, such as via an application, may wirelessly control camera software, hardware, or both. For example, the user interface device may include a web-based graphical interface accessible by a user for selecting a live or previously recorded video stream from the image capture device **100** for display on the user interface device.

The user interface device may receive information indicating a user setting, such as an image resolution setting (e.g., 3840 pixels by 2160 pixels), a frame rate setting (e.g., 60 frames per second (fps)), a location setting, and/or a context setting, which may indicate an activity, such as mountain biking, in response to user input, and may communicate the settings, or related information, to the image capture device **100**.

FIGS. **2A-2B** illustrate another example of an image capture device **200**. The image capture device **200** includes a body **202** and two camera lenses **204**, **206** disposed on opposing surfaces of the body **202**, for example, in a back-to-back or Janus configuration. Although generally depicted as a camera, it should be appreciated that the particular configuration of the image capture device **200** may be varied in alternate embodiments of the disclosure. For example, it is envisioned that the image capture device **200** may instead take the form of a cell phone.

The image capture device may include electronics (e.g., imaging electronics, power electronics, etc.) internal to the body **202** for capturing images via the lenses **204**, **206** and/or performing other functions. The image capture device may include various indicators, such as an LED light **212** and an LCD display **214**.

The image capture device **200** may include various input mechanisms, such as buttons, switches, and touchscreen

mechanisms. For example, the image capture device **200** may include buttons **216** configured to allow a user of the image capture device **200** to interact with the image capture device **200**, to turn the image capture device **200** on, and to otherwise configure the operating mode of the image capture device **200**. In an implementation, the image capture device **200** includes a shutter button and a mode button. It should be appreciated, however, that, in alternate embodiments, the image capture device **200** may include additional buttons to support and/or control additional functionality.

The image capture device **200** may also include one or more microphones **218** configured to receive and record audio signals (e.g., voice or other audio commands) in conjunction with recording video.

The image capture device **200** may include an I/O interface **220** and an interactive display **222** that allows for interaction with the image capture device **200** while simultaneously displaying information on a surface of the image capture device **200**.

The image capture device **200** may be made of a rigid material such as plastic, aluminum, steel, or fiberglass. In some embodiments, the image capture device **200** described herein includes features other than those described. For example, instead of the I/O interface **220** and the interactive display **222**, the image capture device **200** may include additional interfaces or different interface features. For example, the image capture device **200** may include additional buttons or different interface features, such as interchangeable lenses, cold shoes and hot shoes that can add functional features to the image capture device **200**, etc.

FIG. 2C is a cross-sectional view of an optical module **223** of the image capture device **200** of FIGS. 2A-2B. The optical module **223** facilitates the capture of spherical images, and, accordingly, includes a first image capture device **224** and a second image capture device **226**. The first image capture device **224** defines a first field-of-view **228**, as shown in FIG. 2C, and includes a first integrated sensor-lens assembly (ISLA) **229** that receives and directs light onto a first image sensor **230** via the lens **204**. Similarly, the second image capture device **226** defines a second field-of-view **232**, as shown in FIG. 2C, and includes a second ISLA **233** that receives and directs light onto a second image sensor **234** via the lens **206**. To facilitate the capture of spherical images, the image capture devices **224**, **226** (and related components) may be arranged in a back-to-back (Janus) configuration such that the lenses **204**, **206** face in generally opposite directions.

The fields-of-view **228**, **232** of the lenses **204**, **206** are shown above and below boundaries **236**, **238**, respectively. Behind the first lens **204**, the first image sensor **230** may capture a first hyper-hemispherical image plane from light entering the first lens **204**, and behind the second lens **206**, the second image sensor **234** may capture a second hyper-hemispherical image plane from light entering the second lens **206**.

One or more areas, such as blind spots **240**, **242**, may be outside of the fields-of-view **228**, **232** of the lenses **204**, **206** so as to define a “dead zone.” In the dead zone, light may be obscured from the lenses **204**, **206** and the corresponding image sensors **230**, **234**, and content in the blind spots **240**, **242** may be omitted from capture. In some implementations, the image capture devices **224**, **226** may be configured to minimize the blind spots **240**, **242**.

The fields-of-view **228**, **232** may overlap. Stitch points **244**, **246**, proximal to the image capture device **200**, at which the fields-of-view **228**, **232** overlap may be referred

to herein as overlap points or stitch points. Content captured by the respective lenses **204**, **206**, distal to the stitch points **244**, **246**, may overlap.

Images contemporaneously captured by the respective image sensors **230**, **234** may be combined to form a combined image. Combining the respective images may include correlating the overlapping regions captured by the respective image sensors **230**, **234**, aligning the captured fields-of-view **228**, **232**, and stitching the images together to form a cohesive combined image.

A slight change in the alignment, such as position and/or tilt, of the lenses **204**, **206**, the image sensors **230**, **234**, or both, may change the relative positions of their respective fields-of-view **228**, **232** and the locations of the stitch points **244**, **246**. A change in alignment may affect the size of the blind spots **240**, **242**, which may include changing the size of the blind spots **240**, **242** unequally.

Incomplete or inaccurate information indicating the alignment of the image capture devices **224**, **226**, such as the locations of the stitch points **244**, **246**, may decrease the accuracy, efficiency, or both of generating a combined image. In some implementations, the image capture device **200** may maintain information indicating the location and orientation of the lenses **204**, **206** and the image sensors **230**, **234** such that the fields-of-view **228**, **232**, the stitch points **244**, **246**, or both may be accurately determined, which may improve the accuracy, efficiency, or both of generating a combined image.

The lenses **204**, **206** may be laterally offset from each other, may be off-center from a central axis of the image capture device **200**, or may be laterally offset and off-center from the central axis. As compared to image capture devices with back-to-back lenses, such as lenses aligned along the same axis, image capture devices including laterally offset lenses may include substantially reduced thickness relative to the lengths of the lens barrels securing the lenses. For example, the overall thickness of the image capture device **200** may be close to the length of a single lens barrel as opposed to twice the length of a single lens barrel as in a back-to-back configuration. Reducing the lateral distance between the lenses **204**, **206** may improve the overlap in the fields-of-view **228**, **232**.

Images or frames captured by the image capture devices **224**, **226** may be combined, merged, or stitched together to produce a combined image, such as a spherical or panoramic image, which may be an equirectangular planar image. In some implementations, generating a combined image may include three-dimensional, or spatiotemporal, noise reduction (3DNR). In some implementations, pixels along the stitch boundary may be matched accurately to minimize boundary discontinuities.

FIGS. 3A-3B are block diagrams of examples of image capture systems.

Referring first to FIG. 3A, an image capture system **300** is shown. The image capture system **300** includes an image capture device **310** (e.g., a camera or a drone), which may, for example, be the image capture device **200** shown in FIGS. 2A-2C.

The image capture device **310** includes a processing apparatus **312** that is configured to receive a first image from a first image sensor **314** and receive a second image from a second image sensor **316**. The image capture device **310** includes a communications interface **318** for transferring images to other devices. The image capture device **310** includes a user interface **320** to allow a user to control image capture functions and/or view images. The image capture device **310** includes a battery **322** for powering the image

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capture device **310**. The components of the image capture device **310** may communicate with each other via the bus **324**.

The processing apparatus **312** may be configured to perform image signal processing (e.g., filtering, tone mapping, stitching, and/or encoding) to generate output images based on image data from the image sensors **314** and **316**. The processing apparatus **312** may include one or more processors having single or multiple processing cores. The processing apparatus **312** may include memory, such as a random-access memory (RAM) device, flash memory, or another suitable type of storage device, such as a non-transitory computer-readable memory. The memory of the processing apparatus **312** may include executable instructions and data that can be accessed by one or more processors of the processing apparatus **312**.

For example, the processing apparatus **312** may include one or more dynamic random-access memory (DRAM) modules, such as double data rate synchronous dynamic random-access memory (DDR SDRAM). In some implementations, the processing apparatus **312** may include a digital signal processor (DSP). In some implementations, the processing apparatus **312** may include an application specific integrated circuit (ASIC). For example, the processing apparatus **312** may include a custom image signal processor.

The first image sensor **314** and the second image sensor **316** may be configured to detect light of a certain spectrum (e.g., the visible spectrum or the infrared spectrum) and convey information constituting an image as electrical signals (e.g., analog or digital signals). For example, the image sensors **314** and **316** may include CCDs or active pixel sensors in a CMOS. The image sensors **314** and **316** may detect light incident through a respective lens (e.g., a fisheye lens). In some implementations, the image sensors **314** and **316** include digital-to-analog converters. In some implementations, the image sensors **314** and **316** are held in a fixed orientation with respective fields-of-view that overlap.

The communications interface **318** may enable communications with a personal computing device (e.g., a smartphone, a tablet, a laptop computer, or a desktop computer). For example, the communications interface **318** may be used to receive commands controlling image capture and processing in the image capture device **310**. For example, the communications interface **318** may be used to transfer image data to a personal computing device. For example, the communications interface **318** may include a wired interface, such as a high-definition multimedia interface (HDMI), a universal serial bus (USB) interface, or a FireWire interface. For example, the communications interface **318** may include a wireless interface, such as a Bluetooth interface, a ZigBee interface, and/or a Wi-Fi interface.

The user interface **320** may include an LCD display for presenting images and/or messages to a user. For example, the user interface **320** may include a button or switch enabling a person to manually turn the image capture device **310** on and off. For example, the user interface **320** may include a shutter button for snapping pictures.

The battery **322** may power the image capture device **310** and/or its peripherals. For example, the battery **322** may be charged wirelessly or through a micro-USB interface.

The image capture system **300** may be used to implement some or all of the techniques described in this disclosure.

Referring to FIG. 3B, another image capture system **330** is shown. The image capture system **330** includes an image capture device **340** and a personal computing device **360** that communicate via a communications link **350**. The image capture device **340** may, for example, be the image

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capture device **100** shown in FIGS. 1A-1D. The personal computing device **360** may, for example, be the user interface device described with respect to FIGS. 1A-1D.

The image capture device **340** includes an image sensor **342** that is configured to capture images. The image capture device **340** includes a communications interface **344** configured to transfer images via the communication link **350** to the personal computing device **360**.

The personal computing device **360** includes a processing apparatus **362** that is configured to receive, using a communications interface **366**, images from the image sensor **342**. The processing apparatus **362** may be configured to perform image signal processing (e.g., filtering, tone mapping, stitching, and/or encoding) to generate output images based on image data from the image sensor **342**.

The image sensor **342** is configured to detect light of a certain spectrum (e.g., the visible spectrum or the infrared spectrum) and convey information constituting an image as electrical signals (e.g., analog or digital signals). For example, the image sensor **342** may include CCDs or active pixel sensors in a CMOS. The image sensor **342** may detect light incident through a respective lens (e.g., a fisheye lens). In some implementations, the image sensor **342** includes digital-to-analog converters. Image signals from the image sensor **342** may be passed to other components of the image capture device **340** via a bus **346**.

The communications link **350** may be a wired communications link or a wireless communications link. The communications interface **344** and the communications interface **366** may enable communications over the communications link **350**. For example, the communications interface **344** and the communications interface **366** may include an HDMI port or other interface, a USB port or other interface, a FireWire interface, a Bluetooth interface, a ZigBee interface, and/or a Wi-Fi interface. For example, the communications interface **344** and the communications interface **366** may be used to transfer image data from the image capture device **340** to the personal computing device **360** for image signal processing (e.g., filtering, tone mapping, stitching, and/or encoding) to generate output images based on image data from the image sensor **342**.

The processing apparatus **362** may include one or more processors having single or multiple processing cores. The processing apparatus **362** may include memory, such as RAM, flash memory, or another suitable type of storage device, such as a non-transitory computer-readable memory. The memory of the processing apparatus **362** may include executable instructions and data that can be accessed by one or more processors of the processing apparatus **362**. For example, the processing apparatus **362** may include one or more DRAM modules, such as DDR SDRAM.

In some implementations, the processing apparatus **362** may include a DSP. In some implementations, the processing apparatus **362** may include an integrated circuit, for example, an ASIC. For example, the processing apparatus **362** may include a custom image signal processor. The processing apparatus **362** may exchange data (e.g., image data) with other components of the personal computing device **360** via a bus **368**.

The personal computing device **360** may include a user interface **364**. For example, the user interface **364** may include a touchscreen display for presenting images and/or messages to a user and receiving commands from a user. For example, the user interface **364** may include a button or switch enabling a person to manually turn the personal computing device **360** on and off. In some implementations, commands (e.g., start recording video, stop recording video,

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or capture photo) received via the user interface 364 may be passed on to the image capture device 340 via the communications link 350.

The image capture system 330 may be used to implement some or all of the techniques described in this disclosure.

Referring now to FIGS. 4A-4D, a door assembly 400 will be discussed, which represents an alternate embodiment of the aforescribed door 115 (FIG. 1B). More specifically, FIG. 4A provides a front, plan view of the image capture device 100 with the door assembly 400 shown in an open position; FIG. 4B provides a front, perspective view of the image capture device 100 with the door assembly 400 shown in the open position; FIG. 4C provides a side, plan view of the image capture device 100 with the door assembly 400 shown in the open position; and FIG. 4D provides a front, perspective view of the image capture device 100 with the door assembly 400 shown in the closed position. Although generally discussed in connection with the image capture device 100 hereinbelow, it should be appreciated that the door assembly 400 may be configured for use with any image capture device, such as the various embodiments described herein (e.g., the aforescribed image capture devices 200, 300).

The door assembly 400 is rotatably (e.g., pivotably) connected to the body 102 of the image capture device 100 such that the door assembly 400 is movable (repositionable) between the open position (FIGS. 4A-4C) and the closed position (FIG. 4D) to reveal and conceal a peripheral cavity 122 defined by the body 102 of the image capture device 100. As seen in FIG. 4C, the peripheral cavity 122 may include, accommodate, or otherwise provide access to one or more components C of the image capture device 100, including, for example, a power source 124 for the image capture device 100 (e.g., the aforementioned battery 322); an accessory port 126; the aforementioned I/O interface 114 (FIG. 1B); a USB-C connector 128; etc.

In the illustrated embodiment, the door assembly 400 completes the exterior of the image capture device 100, and extends along a side (e.g., the left face 102b) of the image capture device between opposite (upper and lower) corner sections 130u, 130l (e.g., between the top face 102e and the bottom face 102f) of the image capture device 100. More specifically, the door assembly 400 includes an upper (first) end 402u that is pivotably connected to the body 102 at (or adjacent to) the corner section 130u such that the upper end 402u is positioned proximate (e.g., adjacent) to the top face 102e of the image capture device 100, and a lower (second) end 402l that is positioned at (or adjacent to) the corner section 130l (when the door assembly 400 is in the closed position) such that the lower end 402l is positioned proximate (e.g., adjacent) to the bottom face 102f of the image capture device 100.

FIG. 5 provides a perspective view of the door assembly 400 separated from the image capture device 100 with parts separated. As seen in FIG. 5, the door assembly 400 includes a door body 500; a locking mechanism 600; a biasing member 700 (e.g., a spring clip 702); a sealing member 800; and a spacer 900 that is supported by (e.g., secured to) the sealing member 800.

FIG. 6 provides a bottom, perspective view of the door body 500, and FIG. 7 provides a partial, (vertical) cross-sectional view of the door body 500 shown connected to the body 102 of the image capture device 100 via a pivot member 132 (e.g., a hinge pin 134). The door body 500 may include any suitable material or combination of materials, and may be formed through any suitable method of manufacture. In the particular embodiment shown throughout the

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figures, for example, the door body 500 includes a metallic material (e.g., stainless steel, aluminum, etc.), and is formed via injection molding. As discussed in detail below, the door body 500 includes an engagement structure 502; a plurality of bosses 504i-504iv that facilitate connection of the biasing member 700 and the sealing member 800 to the door body 500; and flanges 506 that support the locking mechanism 600.

The engagement structure 502 of the door body 500 is configured to facilitate connection of the door assembly 400 to the body 102 of the image capture device 100, and includes a pair of clips 508. Although shown as being integrally formed with the door body 500 in the illustrated embodiment, it should be appreciated that the engagement structure 502 may be formed as a separate, discrete component that is secured to the door body 500 (e.g., via adhesive, welding, etc.) without departing from the scope of the present disclosure.

The clips 508 are configured for engagement with the pivot member 132 (FIG. 7) to axially (vertically) fix the door body 500 in relation to the housing 102 of the image capture device 100 while allowing the door assembly 400 to rotate in relation to the body 102 during opening and closure. More specifically, the door assembly 400 is rotatable about an axis of rotation XR (FIGS. 4B, 5, 7) that extends through the pivot member 132, and through the clips 508.

The clips 508 are identical in configuration, and, as such, in the following description, reference may be made to a single clip 508 only in the interest of conciseness. Each clip 508 is generally C-shaped in configuration, and includes arms 510i, 510ii defining ends 512i, 512ii, respectively. The arms 510i, 510ii define a channel 514 (FIGS. 5-7) that is configured to receive the pivot member 132 such that the clip 508 is rotatable in relation to the pivot member 132 during opening and closure of the door assembly 400. For example, in certain embodiments, it is envisioned that each clip 508 may be configured to create an interference fit (e.g., a snap-fit) with the pivot member 132. The clip 508, however, is configured to create sufficient clearance with the pivot member 132 to allow for rotation of the clip 508 in relation to the pivot member 132 in the manner described herein.

To facilitate connection of the clips 508 to the pivot member 132, it is envisioned that the clips 508 may include a resilient (e.g., flexible) material, such as stainless steel, as mentioned above, such that the arm 510ii is deflected outwardly (i.e., away from the arm 510i) during connection to the pivot member 132, and is returned to its normal position (seen in FIGS. 5, 6) upon receipt of the pivot member 132 within the channel 514. To enhance the connection between the clip 508 and the pivot member 132, as seen in FIG. 7, the end 512i of the arm 510i includes an arcuate recess 516 with a configuration that corresponds to an outer contour defined by the pivot member 132 such that the pivot member 132 is seated within the recess 516 upon connection. As the pivot member 132 seats within the recess 516, due to the resilient (flexible) material used in construction of the clip 508, and the resultant deflection created during connection of the clip 508 to the pivot member 132, in certain embodiments, as the clip 508 returns to its normal position, it is envisioned that the clip 508 may provide an audible indication that the pivot member 132 has been properly connected to the clip 508.

As seen in FIG. 7, the end 512i of each clip 508 defines a bearing surface 518 that is configured for contact with a corresponding bearing surface 136 defined by the body 102 of the image capture device 100 within the peripheral cavity

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122. More specifically, the bearing surface **518** of each clip **508** includes segments **520i**, **520ii** defining an obtuse angle  $\alpha$  therebetween, and the bearing surface **136** includes corresponding segments **138i**, **138ii** defining an angle  $\beta$  therebetween of approximately  $90^\circ$ . It should be appreciated, however, that the configuration of the bearing surfaces **136**, **518** (e.g., the values for the angles  $\alpha$ ,  $\beta$ ) may be varied in alternate embodiments without departing from the scope of the present disclosure (e.g., depending upon the desired functionality of the door assembly **400**).

When the door assembly **400** is in the open position (FIGS. 4A-4C), upon reaching a threshold orientation, continued rotation of the door assembly **400** will cause contact between the bearing surfaces **136**, **518** to create a leverage effect that results in the application of an outwardly-directed force (in the direction indicated by arrow **1** (FIG. 7)) that will cause the clip **508** to separate from the pivot member **132**, thus removing the door assembly **400** from the body **102** of the image capture device **100**. For example, it is envisioned that the clips **508** may be configured such that the bearing surface **518** contacts the bearing surface **136** upon positioning of the door assembly **400** in generally orthogonal relation to the body **102** of the image capture device **100**, as seen in FIGS. 4B, 4C, and that continued rotation of the door assembly **400** in relation to the body **102** of the image capture device **100** will cause detachment of the door assembly **400** from the image capture device **100**.

As seen in FIGS. 5 and 6, the door assembly **400** further includes a detent **522** (e.g., a protrusion, protuberance, etc.) that facilitates connection of the door assembly **400** to the body **102** of the image capture device **100**. More specifically, the detent **522** is positioned for contact with the pivot member **132** to urge the pivot member **132** into the channel **514** in each clip **508**. To further promote proper connection of the door assembly **400** to the pivot member **132**, and, thus, the image capture device **100**, in certain embodiments, the detent **522** may include a groove (recess) **524** (FIG. 6) that is configured to receive (or otherwise accommodate) the pivot member **132**.

During connection of the door assembly **400**, it is envisioned that the pivot member **132** may experience resilient deflection (e.g., bending) via forces collectively applied to the pivot member **132** by the clips **508** and the detent **522**. More specifically, it is envisioned that the pivot member **132** may be deflected towards the clips **508** by the detent **522** and may return to its normal (linear) position upon seating within the channel **514** defined by each clip **508**. Additionally, it is envisioned that the forces applied to the pivot member **132** during connection of the door assembly **400** may further contribute to the audible indication created upon proper connection of the clips **508** to the pivot member **132** mentioned above.

With particular reference to FIGS. 5 and 6, the door body **500** includes bosses **504i**, **504ii**, **504iii**, **504iv** that are configured to receive corresponding fasteners **524** to secure the biasing member **700** and the sealing member **800** to the door body **500**. More specifically, fasteners **524i** extend through the sealing member **800** into the bosses **504i**, **504ii**, **504iii** to fixedly connect the sealing member **800** to the door body **500**, and a fastener **524iv** extends through the boss **504iv** to fixedly connect the biasing member **700** to the door body **500**, as described in further detail below. Whereas the bosses **504i**, **504ii**, **504iii** are each generally cylindrical in configuration, the boss **504iv** defines an inclined surface **526** that is configured to support the biasing member **700** at an angle in relation to a longitudinal axis Y of the door assembly **400** (and in relation to the locking mechanism

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**600**) in the manner described hereinbelow. To further secure the biasing member **700** to the door body **500**, the door body **500** includes a post **528** that is configured for receipt within a corresponding opening **702** defined by the biasing member **700**, further details of which are provided below.

With reference to FIG. 8 as well, which provides a (horizontal) cross-sectional view of the door assembly **400**, the flanges **506** extend inwardly from outer walls **530i**, **530ii** of the door body **500** so as to define channels **532i**, **532ii** that are configured to receive the locking mechanism **600**. More specifically, in the illustrated embodiment, the door body includes a pair of flanges **506i**, **506ii** that extend inwardly from the outer wall **530i**, and a pair of flanges **506iii**, **506iv** that extend inwardly from the outer wall **530ii**. It should be appreciated, however, that the number of flanges **506** may be varied in alternate embodiments without departing from the scope of the present disclosure. For example, embodiments in which the door body **500** includes a single (e.g., more elongate) flange **506** on each outer wall **530** would also be within the scope of the present disclosure, as would embodiments including three or more flanges **506** on each outer wall **530**.

In certain embodiments, such as that shown throughout the figures, the door body **500** may further include a plurality of supports **534** that extend inwardly from an inner surface **536** of the door body **500** (i.e., towards the sealing member **800**) to collectively define the channels **532i**, **532ii** with the flanges **506**. More specifically, in the illustrated embodiment, the door body **500** includes four supports **534i-534iv** configured as support blocks **538i-538iv** that are positioned in general registration (alignment) with the flanges **506i-506iv**, respectively. It should be appreciated, however, that the configuration and/or the number of supports **534** included on the door body **500** may be varied in alternate embodiments without departing from the scope of the present disclosure, as discussed above in connection with the flanges **506**. For example, embodiments in which supports **536** are configured as detents (or other such projections) would also be within the scope of the present disclosure, as would embodiments in which the door body **500** includes a pair of supports **534** that are positioned on opposite sides of the door body **500**.

In certain embodiments, such as that seen in FIGS. 5 and 6, for example, the door body **500** may further include one or more stiffening ribs **540** (e.g., to reinforce and/or strengthen a lower (distal) end **542** of the door body **500**). More specifically, in the illustrated embodiment, the door body **500** includes a pair of stiffening ribs **540i**, **540ii** positioned adjacent to the boss **504iii** that extend vertically upward from the lower (distal) end **542** of the door body **500** at an angle to the outer walls **530i**, **530ii**, respectively. It should be appreciated, however, that the configuration, the orientation, and/or the number of ribs **540** included on the door body **500** may be varied in alternate embodiments without departing from the scope of the present disclosure. For example, embodiments including greater and fewer ribs **540** would also be within the scope of the present disclosure, as would embodiments including ribs **540** that extend in parallel and/or orthogonal relation to a length of the door body **500**. Additionally, although shown as being integrally formed with the door body **500** in the illustrated embodiment, it should be appreciated that the ribs **540** may be formed as separate, discrete structures that may be secured to the door body **500** (e.g., via adhesive, welding, etc.) without departing from the scope of the present disclosure.

With reference now to FIGS. 5 and 8, the locking mechanism **600** will be discussed. The locking mechanism **600**

may include any suitable material or combination of materials, and may be formed through any suitable method of manufacture. In the particular embodiment shown throughout the figures, for example, as discussed above in connection with the door body 500, the locking mechanism 600 includes a metallic material (e.g., stainless steel, aluminum, etc.), and is formed via injection molding. As discussed in detail below, the locking mechanism 600 includes a locking member 602; a tactile member 604; a body portion 606 including a pair of rails 608 (FIG. 8); and one or more deflectors 610.

With reference to FIGS. 9-16 as well, the locking mechanism 600 is movable between locked and unlocked (first and second) positions along an axis of movement YL that extends in generally parallel relation to the longitudinal axis Y of the door assembly 400. More specifically, FIGS. 9 and 10 provide partial, (vertical) cross-sectional views showing the locking mechanism 600 in the locked and unlocked positions, respectively; FIGS. 11 and 12 provide side, perspective views of the door assembly 400 with the locking mechanism 600 shown in the locked position and the unlocked position, respectively; FIGS. 13 and 14 provide partial, top, perspective views of the door assembly 400 (with the sealing member 800 and the spacer 900 removed) showing the locking mechanism 600 in the locked and unlocked positions, respectively; and FIGS. 15 and 16 provide side, (vertical) cross-sectional views of the door assembly 400 with the locking mechanism 600 shown in the locked and unlocked positions, respectively.

In the locked position, the locking mechanism 600 engages with the housing 102 of the image capture device 100 to rotationally fix the door assembly 400 in relation to the housing 102, and, thus, maintain the door assembly 400 in the closed position. By contrast, in the unlocked position, the locking mechanism 600 is disengaged from the housing 102 of the image capture device 100 to permit rotation of the door assembly 400 in relation to the housing 102, and, thus, movement of the door assembly 400 into the open position.

With particular reference to FIGS. 9 and 10, the locking member 602 is positioned at a lower (distal) end 612 of the locking mechanism 600 (i.e., at the end of the locking mechanism 600 opposite to the pivot member 132), and is configured for insertion into, and removal from, a corresponding receptacle 140 in the housing 102 of the image capture device 100 such that the locking member 602 is engageable with, and disengageable from, the housing 102 during movement of the locking mechanism 600 between the unlocked and locked positions. More specifically, in the illustrated embodiment, the locking member 602 is configured as a tooth 614 that is configured for insertion into an opening 142 (e.g., a channel or other such surface irregularity) defined by the housing 102. It should be appreciated, however, that the particular configuration of the locking member 602 and the receptacle 140 may be varied in alternate embodiments without departing from the scope of the present disclosure. The locking member 602 extends upwardly (vertically) from an end wall 616 of the locking mechanism 600 in the direction of movement of the locking mechanism 600 in transitioning from the unlocked position to the locked position so as to define a groove 618 with the end wall 616. As seen in FIGS. 9 and 10, the end wall 616 is arcuate in configuration so as to match the overall exterior contour defined by the housing 102, whereby the end wall 616 sits flush with the bottom face 102f of the image capture device 100 when the locking mechanism 600 is in the locked position.

Referring to FIGS. 11 and 12 in particular, to facilitate movement between the locked position and the unlocked position, the locking mechanism 600 includes the tactile member 604, which is configured for manual engagement by a user such that a suitable force can be applied to the locking mechanism 600 to manually unlock the locking mechanism 600. For example, in the illustrated embodiment, the tactile member 604 is configured as an exterior flange 620 defining a finger grab 624. As seen in FIG. 11, in the locked position, the exterior flange 620 is configured for contact with a lower (distal) end surface 544 defined by the door body 500 (e.g., to reduce, if not entirely eliminate, gapping between the locking mechanism 600 and the door body 500 when the locking mechanism 600 is in the locked position).

Referring again to FIGS. 5 and 8, the rails 608 extend laterally (horizontally) from the body portion 606 of the locking mechanism 600 such that the rails 608 are positioned beneath the flanges 506 (i.e., between the flanges 506 and the supports 534). More specifically, in the embodiment of the disclosure shown throughout the figures, the body portion 606 includes a (first) rail 608i that is configured for positioning beneath the flanges 506i, 506ii within the channel 532i, and a (second) rail 608ii that is configured for positioning beneath the flanges 506iii, 506iv within the channel 532ii. The respective positioning of the rails 608i, 608ii within the channels 532i, 532ii restricts (if not entirely prevents) relative horizontal movement between the door body 500 and the locking mechanism 600 (i.e., movement of the locking mechanism 600 towards and/or away from the door body 500), while facilitating relative vertical movement (sliding) of the locking mechanism 600 relative to the door body 500 as the locking mechanism transitions between the locked and unlocked positions.

Referring to FIGS. 13 and 14 as well, the body portion 602 of the locking mechanism 600 defines a chamber 622 (FIG. 5) (e.g., a cavity 624) that accommodates the boss 504iv and the biasing member 700 such that the biasing member 700 extends into the chamber 622, as described in further detail below. The chamber 622 is defined at an upper end 626 (FIG. 13) by a (horizontal) end wall 628 that is configured for contact with the biasing member 700 to limit (vertical) movement of the locking mechanism 600 relative to the door body 500. Together with the biasing member 700, the end wall 628 of the locking mechanism 600 defines a range of (vertical) motion for the locking mechanism 600 (e.g., relative to the door body 500 and the biasing member 700) that prevents overextension of the locking mechanism 600, and inadvertent (e.g., accidental or unwanted) removal of the locking mechanism 600 from the door assembly 400.

Additionally, in certain embodiments, the body portion 606 of the locking mechanism 600 may also include a cutout 630 (FIG. 5) that is configured to receive the boss 504iii during movement of the locking mechanism 600 between the locked and unlocked positions, and/or a relief 632 that allows the overall weight of the locking mechanism 600 to be reduced.

With reference to FIGS. 5, 13, and 14, the deflector(s) 610 are configured for engagement with the biasing member 700 to facilitate horizontal movement of the biasing member 700 relative to the door body 500 during movement of the locking mechanism 600 between the locked position and the unlocked position. More specifically, as elaborated upon below, the deflector(s) 610 are configured to deflect the biasing member 700 inwardly (i.e., away from the door body 500, and towards the sealing member 800) as the locking mechanism 600 moves from the locked position to the unlocked position, and support the biasing member 700



during movement towards the door body **500** (and away from the sealing member **800**) as the locking mechanism **600** moves from the unlocked position to the locked position. To support such movement, each deflector **610** includes an inclined (ramped) surface **634** that extends vertically upward from the body portion **606** of the locking mechanism **600** (towards the pivot member **132**) at an angle  $\delta$  (FIG. 13), and a generally planar end **636** that extends from the inclined surface in a generally vertical orientation.

In the particular embodiment of the disclosure shown throughout the figures, the locking mechanism **600** includes a pair of deflectors **610i**, **610ii** that are configured such that the angle  $\delta$  lies substantially within the range of approximately  $30^\circ$  to approximately  $60^\circ$ . It should be appreciated, however, that the number of deflectors **610** and/or the configuration of the deflector(s) **610** may be varied in alternate embodiments without departing from the scope of the present disclosure. For example, embodiments including a single deflector **610** would also be within the scope of the present disclosure, as would embodiments in which the deflector(s) **610** are configured such that the angle  $\delta$  lies outside the range indicated above.

In certain embodiments, such as that seen in FIGS. 5, 13, and 14, for example, the locking mechanism **600** may further include one or more stiffening sections **638** (e.g., to reinforce and/or strengthen the locking mechanism **600**). More specifically, in the illustrated embodiment, the locking mechanism **600** includes a pair of stiffening sections **638i**, **638ii** that are positioned vertically above (proximally of) the deflectors **610i**, **610ii**, respectively.

With continued reference to FIGS. 5, 13, and 14, the biasing member **700** will be discussed. The biasing member **700** may include any suitable material or combination of materials, and may be formed through any suitable method of manufacture (e.g., stamping, injection molding, machining, etc.). In the particular embodiment shown throughout the figures, for example, the biasing member **700** is integrally (e.g., monolithically) formed from a resilient (e.g., flexible) metallic material (e.g., spring steel, aluminum, etc.).

In the illustrated embodiment, the biasing member **700** is configured as a spring plate **704** that includes opposite upper and lower (first and second) ends **706u**, **706l**, and a body portion **708** that is positioned between the ends **706u**, **706l**. The upper end **706u** is spaced vertically from the lower end **706l** (i.e., closer to the pivot member **132**), and is axially (vertically) fixed to the door body **500**. More specifically, the upper end **706u** includes a first section **710** defining the opening **702** that is configured to receive the post **528** extending from the door body **500**, and a second section **712** defining an opening **714**. The opening **714** is configured to receive the fastener **524ii** such that the fastener **524ii** extends through the opening **714** in the second section **712** of the biasing member **700**, and into the boss **504iv** to fixedly connect the biasing member **700** to the door body **500**, whereby the second section **712** is supported by the boss **504iv**. The second section **712** is spaced laterally inward from the first section **710** (i.e., the second section **712** is positioned closer to the sealing member **800**) in generally parallel relation to the first section **710**. The second section **712** is connected to the first section **710** by a (horizontal) flange **716** that is oriented in generally orthogonal relation to each of the sections **710**, **712**.

The body portion **708** of the biasing member **700** is generally linear in configuration and extends distally from the second section **712** of the upper end **706u**. More specifically, the body portion **708** extends from the second

section **712** at an angle  $\gamma$  (FIG. 13) such that the lateral (horizontal) distance between the lower end **706l** and the sealing member **800** is greater than the lateral (horizontal) distance between the second section **712** and the sealing member **800**.

The lower end **706l** of the biasing member **700** includes a pair of wings **718i**, **718ii** that extend laterally (horizontally) from the body portion **708** such that the biasing member **700** includes an overall configuration that is generally T-shaped. The wings **718i**, **718ii** are configured for contact with the deflectors **610i**, **610ii** extending from the locking mechanism **600**, respectively, during movement of the locking mechanism **600**. Contact between the wings **718i**, **718ii** and the deflectors **610i**, **610ii** inhibits (if not entirely prevents) rotation of the biasing member **700** relative to the door body **500** during movement of the locking mechanism **600**. However, as mentioned above, it is envisioned that the number of deflectors **610** included on the locking mechanism **600** may be varied in alternate embodiments of the disclosure (e.g., such that the locking mechanism **600** includes a single deflector **610** only). As such, embodiments of the biasing member **700** are also envisioned in which the biasing member **700** may include a single wing **718** only.

Referring to FIGS. 15 and 16 as well, during movement of the locking mechanism **600** between the locked position (FIG. 15) and the unlocked position (FIG. 16), by virtue of the fixed axial (vertical) connection between the upper end **706u** of the biasing member **700** and the door body **500**, the locking member **602** moves relative to the biasing member **700**, which causes movement of the biasing member **700** from a normal (first, unbiased) position (FIGS. 5, 13, 15) to a deflected (second, biased) position (FIGS. 14, 16). More specifically, during movement of the locking mechanism **600** from the locked position to the unlocked position, as the biasing member is deflected, the biasing member **700** traverses the deflectors **610i**, **610ii** such that the wings **718i**, **718ii** travel (upwardly) across the inclined surfaces **634**. To facilitate movement of the wings **718i**, **718ii** across the inclined surfaces **634**, it is envisioned that the wings **718i**, **718ii** may define beveled (angled) upper surfaces **720i**, **720ii**, respectively, that are angled in correspondence with the inclined surfaces **634** (i.e., such that the angle defined by the beveled upper surfaces **720i**, **720ii** approximates or matches the angle  $\delta$  (FIG. 13) defined by the inclined surfaces **634**). As the biasing member **700** traverses the deflectors **610i**, **610ii**, the biasing member **700** is deflected away from the door body **500** (and towards the sealing member **800**) along an axis of movement XB that extends in generally orthogonal relation to the longitudinal axis Y of the door assembly, thereby reducing the angle  $\gamma$  (FIG. 13). As seen in FIG. 14, when the locking mechanism **600** is in the unlocked position, the biasing member **700** is supported by the respective ends **636i**, **636ii** of the deflectors **610i**, **610ii** in a generally linear configuration such that the biasing member **700** extends in generally parallel relation to the longitudinal axis Y of the door assembly **400** (and the locking mechanism **600**).

Oppositely, as the locking member **602** moves from the unlocked position to the locked position, the biasing member **700** traverses the deflectors **610i**, **610ii** such that the wings **718i**, **718ii** travel (downwardly) across the inclined surfaces **634**. The biasing member **700** is, thus, returned to its normal configuration (FIGS. 5, 13, 15), which is facilitated by the inclusion of resilient material(s) in construction of the biasing member **700**. As the normal configuration of the biasing member **700** is restored, the distance between the



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wings **718i**, **718ii** and the door body **500** is reduced, and the angle  $\gamma$  at which the body portion **708** of the biasing member **700** extends from the second section **712** is increased such that the biasing member **700** again extends at an angle to the longitudinal axis Y of the door assembly **400** (and at an angle to the locking mechanism **600**).

As mentioned above and seen in FIGS. **13** and **14**, the biasing member **700** is configured for receipt within the chamber **622** defined by the locking mechanism **600**. When the locking mechanism **600** is fully extended (unlocked), the flange **716** connecting the sections **710**, **712** of the upper end **706u** of the biasing member **700** comes into contact with the end wall **628** defining the chamber **622**. The flange **716**, thus, provides a stop **722** (FIG. **14**) that limits (vertical) travel of the locking mechanism **600**.

With reference now to FIGS. **4B**, **5**, and **17**, the sealing member **800** will be discussed. FIG. **17** provides a partial, (vertical) cross-sectional view of the door assembly **400** shown connected to the body **102** of the image capture device **100**. The sealing member **800** is configured in correspondence with the peripheral cavity **122** defined by the body **102** of the image capture device **100** such that the sealing member **800** is insertable into and removable from the peripheral cavity **122** during opening and closure of the door assembly **400**. More specifically, in the illustrated embodiment, the sealing member **800** includes a pair of generally linear sidewalls **802i**, **802ii**; a pair of generally linear end walls **804i**, **804ii** that extend between the sidewalls **802i**, **802ii**; and radiused corner portions **806i**-**806iv**. It should be appreciated, however, that the specific configuration of the sealing member **800** may be altered in various embodiments without departing from the scope of the present disclosure (e.g., depending upon the particular configuration of the image capture device **100**, the peripheral cavity **122**, etc.).

The sealing member **800** includes a resilient, compressible material to facilitate sealed engagement with the body **102** of the image capture device **100** upon closure of the door assembly **400**, and, thus, the formation of a (water-proof) seal in the peripheral cavity **122**. More specifically, as the door assembly **400** is closed, pressure is applied to the sealing member **800** as the sealing member **800** is compressed against the body **102** of the image capture device **100**, which causes lateral (horizontal) and/or axial (vertical) expansion of the sealing member **800** to thereby seal against the body **102**. It is envisioned that the sealing member **800** may include (e.g., may be formed from) any material or combination of materials suitable for the intended purpose of sealing the body **102** (e.g., the peripheral cavity **122**) in the manner described herein. For example, in the particular embodiment of the disclosure illustrated throughout the figures, the sealing member **800** includes an outer layer **808o** (FIG. **8**) that is formed from a (first) compressible material (e.g., silicone rubber), and an inner layer (core) **808i** that is formed from a (second) material (e.g., a metallic material, polycarbonate, etc.) to increase rigidity and stability of the sealing member **800** and the door assembly **400**. It should be appreciated, however, that, in alternate embodiments of the disclosure, it is envisioned that the material(s) used in construction of the sealing member **800** may be varied, and that the sealing member **800** may be formed from a single material only.

As seen in FIG. **5**, the sealing member **800** is spaced inwardly from the locking mechanism **600** (i.e., further from the door body **500** and closer to the body **102** of the image capture device **100**) and is integrated into the door assembly **400**. More specifically, the sealing member **800** is fixedly

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connected to the door body **500** such that the locking mechanism **600** and the biasing member **700** are positioned between the door body **500** and the sealing member **800**. To facilitate connection of the sealing member **800** to the door body **500**, in the illustrated embodiment, the sealing member **800** includes a plurality of openings **810** that are configured to receive the fasteners **524i** such that the fasteners **524i** extend through the sealing member **800** into the bosses **504i**, **504ii**, **504iii**, as mentioned above.

In certain embodiments of the disclosure, such as that shown throughout the figures, the door assembly **400** may further include the aforementioned spacer **900**, which is seen in FIGS. **4A**, **4B**, and **5**, for example. The spacer **900** is configured for positioning between the sealing member **800** and the body **102** of the image capture device **100**, and, in the illustrated embodiment, is configured as a foam block **902**. The spacer **900** may include (e.g., may be formed from) any material suitable for the intended purpose(s) of enhancing the seal formed between the sealing member **800** and the body **102** of the image capture device **100** upon closure of the door assembly **400**; reducing (if not entirely eliminating) undesirable relative movement between the components of the door assembly **400**; increasing shock absorption; and/or enhancing electrical connectivity between the components of the image capture device (e.g., connection of the battery **322**).

To facilitate proper orientation of the spacer **900** relative to the sealing member **800**, in certain embodiments, the sealing member **800** may include one or more raised ribs **812** (or other such projections or surface irregularities) on an inner face **814** thereof that collectively define a receiving space **816** for the spacer **900** to guide the spacer **900** into proper positioning. Additionally, or alternatively, it is envisioned that the spacer **900** may be secured to the sealing member **800**, such as, for example, through the use of one or more mechanical fasteners (e.g., screws), an adhesive, etc.

With reference now to FIGS. **5**, **6**, **8**, and **13-16**, assembly of the door assembly **400** will be discussed. Initially, the biasing member **700** is secured to the door body by positioning the post **528** within the opening **702** defined by the upper end **706u** of the biasing member **700**, and by inserting the fastener **524ii** into the boss **504iv**, whereby the body portion **708** of the biasing member **700** is supported by the inclined surface **526** (FIG. **6**) defined by the boss **504iv**. Upon connection of the biasing member **700** to the door body **500**, to reduce the overall profile of the door assembly **400** and/or the weight of the door assembly, the biasing member **700** may be positioned within a cavity **546** (FIG. **6**) defined by the door body **500**.

After connection of the biasing member **700** to the door body **500**, the locking mechanism **700** is positioned such that the rail **608i** (FIG. **8**) is positioned beneath the flanges **506i**, **506ii** within the channel **532i**, and the rail **608ii** is positioned beneath the flanges **506iii**, **506iv** within the channel **532ii**. When so positioned, the body portion **606** of the locking mechanism **600** overlays the first section **710** of the upper end **706u** of the biasing member **700** within a space **640** (FIG. **13**) between the flange **506** of the biasing member **700** and the bosses **504i**, **504ii**, and the wings **718i**, **718ii** included at the lower end **706l** of the biasing member **700** are respectively positioned adjacent to (e.g., in contact with) the deflectors **610i**, **610ii**.

Thereafter, the sealing member **800** can be connected to the door body **500** via insertion of the fasteners **524i** through the openings **810** and into the bosses **504i**, **504ii**, **504iii** on the door body **500**, and the spacer **900** can be connected to

the sealing member **800** (e.g., by securing the spacer **900** within the receiving space **816** defined on the inner face **814** of the sealing member **800** by the ribs **812**). Upon connection of the sealing member **800** to the door body **500**, a lower end **8181** of the sealing member **800** is received within the groove **618** defined by the locking member **602** (e.g., the tooth **614**) and the end wall **616** of the locking mechanism **600**.

With reference now to FIGS. 4A-17, use and operation of the door assembly **400** will be discussed. When necessary or desired, the door assembly **400** can be moved from the closed position (FIG. 4D) to the open position (FIGS. 4A-4C) (e.g., to remove and/or replace the power source **124** (e.g., the battery **322**) with a larger power source **124**, and/or to provide access to the accessory port **126**, the I/O interface **114**, the USB-C connector **128**, etc.). To allow for movement of the door assembly **400** from the closed position to the open position, the locking mechanism **600** is moved from the locked position (FIGS. 9, 11, 13, 15) into the unlocked position (FIGS. 10, 12, 14, 16), such as, for example, via the manual application of force to the tactile member **604**. Due to the connection between the door body **500**, the biasing member **700**, and the sealing member **800** established by the fasteners **524i**, **524ii** (FIG. 5), the locking mechanism **600** is movable relative to each of the door body **500**, the biasing member **700**, and the sealing member **800** during locking and unlocking. The door body **500**, the biasing member **700**, and the sealing member **800**, thus, collectively constitute a stationary subassembly, and the locking mechanism **600** constitutes a movable subassembly.

The biasing member **700** resists movement of the locking mechanism **600** via contact between the wings **718i**, **718ii** and the deflectors **610i**, **610ii**, respectively, (FIGS. 5, 13-16) until a threshold force is applied to the locking mechanism **600** (e.g., via the tactile member **604**), which inhibits (if not entirely prevents) accidental or unwanted movement of the locking mechanism **600** into the unlocked position (e.g., in the event that the image capture device **100** is dropped), and, thus, inadvertent (e.g., accidental or unwanted) opening of the door assembly **400**. Upon application of the threshold force, the lower end **7061** of the biasing member **700** is deflected inwardly (i.e., towards the sealing member **800**) as the wings **718i**, **718ii** begin to travel (upwardly) across the inclined surfaces **634** defined by the deflectors **610i**, **610ii**, thereby reducing the angle  $\gamma$  (FIG. 13) until the wings **718i**, **718ii** come to rest upon the respective ends **512i**, **512ii** of the deflectors **610i**, **610ii** upon full extension of the locking mechanism **600**, as seen in FIGS. 14, 16. As the locking member **602** moves (slides) distally (i.e., away from the pivot member **132**), the locking member **602** is removed from the receptacle **140** (FIGS. 9, 10) in the housing **102** of the image capture device **100**.

After movement of the locking mechanism **600** into the unlocked position, and removal of the locking member **602** from the receptacle **140**, the door assembly **400** can be rotated in relation to (i.e., away from) the body **102** of the image capture device **100** into the open position about the axis of rotation XR extending through the pivot member **132**, and through the clips **508** of the engagement structure **502** on the door body **500**.

If necessary or desired, the door assembly **400** can then be separated from the body **102** of the image capture device **100**. For example, a pulling force can be applied to the door assembly **400** to deflect the arms **510i**, **510ii** of the clips **508** such that the clips **508** can be separated from the pivot member **132**. Alternatively, the door assembly **400** can be rotated beyond the (generally orthogonal) threshold position

seen in FIGS. 4A, 4B such that the bearing surface **518** (FIG. 7) defined at the ends **512i** of the arms **510i** of each clip **508** contacts the bearing surface **136** defined by the body **102** of the image capture device **100**. Upon such contact between the bearing surfaces **518**, **136**, as mentioned above, the continued application of force results in the creation of an outwardly-directed force (in the direction indicated by arrow **1** (FIG. 7)) that will cause the clip **508** to separate from the pivot member **132**, thus removing the door assembly **400** from the body **102** of the image capture device **100**.

To reconnect the door assembly **400** to the body **102** of the image capture device **100**, the pivot member **132** is re-inserted into the clips **508**. During reconnection, the resilient material used in construction of the clips **508** allows for deflection of the clips **508**. More specifically, the pivot member **132** deflects the arm **510ii** of each clip **508** outwardly (away from the arm **510i**), during which, the pivot member **132** may be resiliently deflected via forces collectively applied to the pivot member **132** by the clips **508** and the detent **522** (FIG. 6). Upon seating of the pivot member **132** within the channel **514** defined by each clip **508**, the pivot member **132** is returned to its normal (linear) configuration.

After reconnection of the door assembly **400**, the door assembly **400** can be rotated in relation to (i.e., towards) the body **102** of the image capture device **100** into the closed position. During closure of the door assembly **400**, the sealing member **800** and the spacer **900** are compressed (e.g., via contact with the portions of the body **102** defining the peripheral cavity **122**) so as to seal the door assembly **400** and the body **102**. Once closed, the locking mechanism **600** can be moved into the locked position (FIGS. 9, 11, 13, 15), during which, the lower end **7061** of the biasing member **700** moves outwardly (i.e., away from the sealing member **800**) as the wings **718i**, **718ii** travel (downwardly) across the inclined surfaces **634** defined by the deflectors **610i**, **610ii**, thereby increasing the angle  $\gamma$  (FIG. 13). As the locking mechanism **600** moves (slides) proximally (i.e., towards the pivot member **132**), the locking member **602** (FIGS. 9, 10) is re-inserted into the receptacle **140** in the housing **102** of the image capture device **100** to thereby inhibit (if not entirely prevent) inadvertent (e.g., accidental or unwanted) opening of the door assembly **400** (e.g., in the event that the image capture device **100** is dropped).

During movement of the locking mechanism **600** into the locked position, it is envisioned that contact between the wings **718i**, **718ii** and the deflectors **610i**, **610ii** may facilitate (e.g., encourage) proximal (upward) movement of the locking mechanism **600** (i.e., towards the pivot member **132**). More specifically, due to the resilient construction of the biasing member **700**, and the angled configuration of the deflectors **610i**, **610ii**, it is envisioned that the biasing member **700** may apply a force to the locking mechanism **600** during return of the biasing member **700** to its normal position (FIGS. 13, 15) that may urge the locking member **602** proximally (upwardly).

It is envisioned that the sliding motion of the locking member **602** during the locking and unlocking of the locking mechanism **600** may improve the user feel and the overall user experience, in that unlocking of the door assembly **400**, opening of the door assembly **400**, and/or removal of the door assembly **400** from the body **102** of the image capture device **100** may be accomplished via a single motion (i.e., distal (downward) movement of the locking mechanism **600**). To further improve the user experience, in certain embodiments, it is envisioned that an additional biasing member (e.g., a spring) (not shown) may be positioned

between the body 102 of the image capture device and the door assembly 400 to urge the door assembly 400 into the open position once the locking mechanism 600 is moved into the unlocked position. In such embodiments, it is thus envisioned that the door assembly 400 may be unlocked and opened by a single motion (i.e., by moving the locking mechanism 600 into the unlocked position).

With reference now to FIGS. 18-20, an alternate embodiment of the door assembly will be discussed, which is identified by the reference character 1000. More specifically, FIG. 18 provides a perspective view of the door assembly 1000, which includes a door body 1100; the aforementioned locking mechanism 600, biasing member 700, sealing member 800, and spacer 900; and a clip 1200; FIG. 19 provides a perspective view of the door assembly 1000 shown with parts separated; and FIG. 20 provides a side, plan view illustrating connection of the clip 1200 to the door body 1100. The door assembly 1000 is substantially similar to the door assembly 400 discussed above, but for the configuration of the door body 1100 and inclusion of the clip 1200, and, accordingly, will only be discussed with respect thereto in the interest of brevity.

The door body 1100 is substantially similar to the door body 500 discussed above, but for the configuration of the bosses, which are identified by the reference characters 1102*i*, 1102*ii*. The bosses 1102*i*, 1102*ii* are each configured to receive one of the fasteners 524*i* and respectively include detents 1104*i*, 1104*ii* that are configured for engagement (contact) with the clip 1200, as described in further detail below.

The clip 1200 is positioned vertically above the locking mechanism 600 in generally adjacent relation to the engagement structure 502 and is configured to support and maintain secured engagement between the pivot member 132 (FIG. 20) and the door body 1100 (e.g., the engagement structure 502). The clip 1200 may include any suitable material or combination of materials and may be formed through any suitable method of manufacture (e.g., stamping, injection molding, machining, etc.). In the particular embodiment shown throughout the figures, for example, the clip 1200 is integrally (e.g., monolithically) formed from a resilient (e.g., flexible) metallic material (e.g., spring steel, aluminum, etc.) and includes an upper (first) portion 1202*u*; a lower (second) portion 1202*l*; and an intermediate portion 1202*i* that extends between the respective upper and lower portions 1202*u*, 1202*l*.

The upper portion 1202*u* is configured for positioning within a space 1106 defined between the clips 508 of the engagement structure 502. More specifically, the upper portion 1202*u* defines a transverse (horizontal) dimension (e.g., a width) that is less than that defined by the space 1106 so as to inhibit (if not entirely prevent) contact between the clips 508 and the upper portion 1202*u* of the clip 1200. The upper portion 1202*u* includes a generally arcuate configuration defining a channel 1204 that is configured to receive the pivot member 132 so as to bias (urge) the pivot member 132 outwardly (i.e., towards the detent 122) and thereby reduce (if not entirely eliminate) relative movement between the pivot member 132 and the engagement structure 502.

To further facilitate engagement (contact) between the clip 1200 and the pivot member 132, it is envisioned that the upper portion 1202*u* may include a bend 1206 defining a finger 1208, as seen in FIG. 21, which provides a partial, side view of the clip 1200 shown connected to the door body 1100 according to an alternate embodiment of the disclosure. The finger 1208 extends outwardly (i.e., towards the arm 510*i* of the clip 508 and away from the arm 510*ii*) such

that the clip 1200 further circumscribes the pivot member 132 upon receipt within the channel 1204. In such embodiments, it is envisioned that the upper portion 1202*u* of the clip 1200 may be deflected inwardly (i.e., away from the arm 510*i* and towards the arm 510*ii*) via engagement (contact) between the finger 1208 and the pivot member 132 during connection to the pivot member 132 to increase the bias applied to the pivot member 132 by the clip 1200.

The upper portion 1202*u* defines a curvature that is similar to that defined by the engagement structure 502 (e.g., the clips 508). For example, as seen in FIG. 20, it is envisioned that the curvature defined by the upper portion 1202*u* may be slightly greater than that defined by the engagement structure 502 (e.g., to facilitate more secured engagement between the pivot member 132 and the upper portion 1202*u* of the clip 1200).

The intermediate portion 1202*i* of the clip 1200 extends from the upper portion 1202*u* and includes a configuration that substantially approximates the contour defined by the inner surface 536 of the door body 1100. More specifically, as can be appreciated through reference to FIGS. 18 and 19, the intermediate portion 1202*i* defines a curvature that is substantially similar (or identical) to the curvature defined by an upper end 1108 of the door body 1100. In certain embodiments, it is envisioned that the intermediate portion 1202*i* may be configured for contact with the inner surface 536 of the door body 1100 such that that intermediate portion 1202*i* of the clip 1200 is supported by the inner surface 536 of the door body 1100 (e.g., during closure of the door assembly 1000) to facilitate uniform and accurate force distribution across the clip 1200.

As seen in FIG. 19, for example, the curvatures defined by the upper portion 1202*u* of the clip 1200 and the intermediate portion 1202*i* of the clip 1200 extend in different (e.g., opposite) directions. More specifically, whereas the curvature defined by the upper portion 1202*u* extends generally away from the inner surface 536 of the door body 1100, the curvature defined by the intermediate portion 1202*i* extends generally towards the inner surface 536 of the door body 1100.

With reference to FIG. 22, which provides a perspective view of the clip 1200 according to an alternate embodiment of the disclosure, it is envisioned that the intermediate portion 1202*i* of the clip 1200 may include one or more weakened sections 1210 to facilitate controlled deformation (flexure) of the clip 1200 (e.g., during opening and closing of the door assembly 1000). In the particular embodiment seen in FIG. 22, for example, the weakened section 1210 includes a plurality of apertures 1212. It should be appreciated, however, that the configuration of the weakened section 1210 may varied in any suitable manner. For example, the weakened section 1210 may include one or more cutouts, reliefs, score lines, etc., either instead of, or in addition to, the apertures 1212.

With reference again to FIGS. 18-20, the lower portion 1202*l* of the clip 1200 extends from the intermediate portion 1202*i* and includes a generally planar (e.g., flat) configuration defining wings 1214*i*, 1214*ii*. The wings 1214*i*, 1214*ii* extend laterally (horizontally) outward from the intermediate portion 1202*i* and are configured for engagement (contact) with the bosses 1102*i*, 1102*ii* on the door body 1100. The bosses 1102*i*, 1102*ii* support the clip 1200 such that the upper portion 1202*u* is cantilevered and floats freely between the clips 508, which allows the clip 1200 to flex (or otherwise deform) between the respective upper and lower portions 1202*u*, 1202*l*. More specifically, the lower portion 1202*l* includes openings 1216*i*, 1216*ii* that are configured to

receive the fasteners **524i** such that the fasteners **524i** extend through the sealing member **800** and into the bosses **1102i**, **1102ii** through the openings **1216i**, **1216ii**. Insertion of the fasteners **524i** into the bosses **1102i**, **1102ii** through the respective openings **1216i**, **1216ii** fixedly secures the clip **1200** to the door body **1100** to limit (if not entirely prevent) rotational, axial (vertical), and/or transverse (horizontal) movement of the clip **1200** relative to the door body **1100** (e.g., movement of the clip **1200** towards and away from the pivot member **132** and/or movement of the clip **1200** towards and away from the sealing member **800**).

Additionally, the lower portion **12021** includes openings **1218i**, **1218ii**, which are configured to receive the detents **1104i**, **1104ii**, respectively, to provide a location feature that facilitates proper location and/or orientation of the clip **1200** in relation to the door body **1100**.

As seen in FIG. **19**, for example, in certain embodiments, the lower end **12021** of the clip **1200** may include a relief **1220** that is configured to accommodate the locking mechanism **600**. In the specific embodiment of the clip **1200** illustrated, the relief **1220** includes an arcuate configuration that receives an upper end **640** of the locking mechanism **600**. It should be appreciated, however, that the particular configuration of the relief **1220** may be altered in various embodiments of the disclose, or eliminated altogether, depending upon the particular configuration of the locking mechanism **600**.

Persons skilled in the art will understand that the various embodiments of the disclosure described herein, and shown in the accompanying figures, constitute non-limiting examples, and that additional components and features may be added to any of the embodiments discussed hereinabove without departing from the scope of the present disclosure. Additionally, persons skilled in the art will understand that the elements and features shown or described in connection with one embodiment may be combined with those of another embodiment without departing from the scope of the present disclosure to achieve any desired result and will appreciate further features and advantages of the presently disclosed subject matter based on the description provided. Variations, combinations, and/or modifications to any of the embodiments and/or features of the embodiments described herein that are within the abilities of a person having ordinary skill in the art are also within the scope of the disclosure, as are alternative embodiments that may result from combining, integrating, and/or omitting features from any of the disclosed embodiments.

Use of the term “optionally” with respect to any element of a claim means that the element may be included or omitted, with both alternatives being within the scope of the claim. Additionally, use of broader terms such as “comprises,” “includes,” and “having” should be understood to provide support for narrower terms such as “consisting of,” “consisting essentially of,” and “comprised substantially of.” Accordingly, the scope of protection is not limited by the description set out above, but is defined by the claims that follow, and includes all equivalents of the subject matter of the claims.

In the preceding description, reference may be made to the spatial relationship between the various structures illustrated in the accompanying drawings, and to the spatial orientation of the structures. However, as will be recognized by those skilled in the art after a complete reading of this disclosure, the structures described herein may be positioned and oriented in any manner suitable for their intended purpose. Thus, the use of terms such as “above,” “below,” “upper,” “lower,” “inner,” “outer,” “left,” “right,” “upward,”

“downward,” “inward,” “outward,” “horizontal,” “vertical,” etc., should be understood to describe a relative relationship between the structures and/or a spatial orientation of the structures. Those skilled in the art will also recognize that the use of such terms may be provided in the context of the illustrations provided by the corresponding figure(s).

Additionally, terms such as “approximately,” “generally,” “substantially,” and the like should be understood to allow for variations in any numerical range or concept with which they are associated. For example, it is intended that the use of terms such as “approximately” and “generally” should be understood to encompass variations on the order of 25%, or to allow for manufacturing tolerances and/or deviations in design.

Although terms such as “first,” “second,” etc., may be used herein to describe various operations, elements, components, regions, and/or sections, these operations, elements, components, regions, and/or sections should not be limited by the use of these terms in that these terms are used to distinguish one operation, element, component, region, or section from another. Thus, unless expressly stated otherwise, a first operation, element, component, region, or section could be termed a second operation, element, component, region, or section without departing from the scope of the present disclosure.

Each and every claim is incorporated as further disclosure into the specification and represents embodiments of the present disclosure. Also, the phrases “at least one of A, B, and C” and “A and/or B and/or C” should each be interpreted to include only A, only B, only C, or any combination of A, B, and C.

What is claimed is:

1. A door assembly for an image capture device, the door assembly comprising:

- a body defining a peripheral cavity; and
- a door assembly configured to close and seal the peripheral cavity, wherein the door assembly is movable between an open position and a closed position and includes:
  - a door body including an engagement structure configured for removable connection to the body of the image capture device;
  - a locking mechanism linearly slidable in relation to the door body along a first axis of movement extending in generally parallel relation to a longitudinal axis of the door assembly between a locked position and an unlocked position;
  - a biasing member configured for engagement with the locking mechanism to resist movement of the locking mechanism from the locked position to the unlocked position until a threshold force is applied to the locking mechanism, whereupon the biasing member is repositioned from a normal position into a deflected position along a second axis of movement extending in transverse relation to the first axis of movement, wherein the biasing member extends at a first angle in relation to the locking mechanism in the normal position and at a second angle in relation to the locking mechanism in the deflected position; and
  - a sealing member configured to sealingly engage the image capture device upon closure of the door assembly, wherein the sealing member is secured to the door body such that the locking mechanism and the biasing member are positioned between the door body and the sealing member.

2. The door assembly of claim 1, wherein the first angle is greater than the second angle.

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3. The door assembly of claim 2, wherein the biasing member extends in generally parallel relation to the longitudinal axis of the door assembly in the deflected position.

4. The door assembly of claim 3, wherein the locking mechanism includes:

- a first deflector defining a first angled surface; and
- a second deflector defining a second angled surface, wherein the first deflector and the second deflector are spaced laterally from each other along a width of the door assembly.

5. The door assembly of claim 4, wherein the biasing member includes:

- a first wing configured for contact with the first angled surface such that the first wing traverses the first deflector during movement of the locking mechanism between the normal position and the deflected position; and
- a second wing configured for contact with the second angled surface such that the second wing traverses the second deflector during movement of the locking mechanism between the normal position and the deflected position.

6. An image capture device comprising:

a body; and

a door assembly movable between an open position and a closed position about a first axis, wherein the door assembly includes:

- a door body having an upper end configured for connection to the image capture device and a lower end;
- a locking mechanism linearly movable in relation to the door body between a locked position and an unlocked position, wherein the locking mechanism is configured for movement towards the lower end during movement from the locked position into the unlocked position; and
- a biasing member configured to resist movement of the locking mechanism from the locked position to the unlocked position until a threshold force is applied to the locking mechanism, wherein the biasing member includes opposite ends spaced along a second axis transverse in relation to the first axis.

7. The image capture device of claim 6, wherein the locking mechanism is movable in relation to the biasing member as the locking mechanism moves between the locked position and the unlocked position.

8. The image capture device of claim 7, wherein the biasing member is fixedly connected to the door body.

9. The image capture device of claim 7, wherein the locking mechanism contacts the biasing member during repositioning between the locked position and the unlocked position.

10. The image capture device of claim 9, wherein contact between the locking mechanism and the biasing member repositions the biasing member from a normal position into a deflected position.

11. The image capture device of claim 10, wherein the biasing member extends at a first angle in relation to the

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locking mechanism in the normal position and at a second angle in relation to the locking mechanism in the deflected position.

12. The image capture device of claim 11, wherein the first angle is greater than the second angle.

13. The image capture device of claim 12, wherein the biasing member extends in generally parallel relation to a longitudinal axis of the door assembly in the deflected position.

14. The image capture device of claim 10, wherein the locking mechanism includes:

- a first deflector; and
- a second deflector spaced laterally from the first deflector along a width of the door assembly.

15. The image capture device of claim 14, wherein the biasing member includes:

- a first wing configured for contact with the first deflector; and
- a second wing configured for contact with the second deflector, wherein the first wing traverses the first deflector during movement of the locking mechanism between the normal position and the deflected position, and the second wing traverses the second deflector during movement of the locking mechanism between the normal position and the deflected position.

16. A door assembly for an image capture device, the door assembly comprising:

- a door body having a first end configured for connection to the image capture device and a second end;
- a locking mechanism movable in relation to the door body along a first axis to thereby lock and unlock the door assembly, wherein the locking mechanism is configured for movement towards one of the first end and the second end to unlock the door assembly; and
- a biasing member configured for engagement with the locking mechanism to resist movement of the locking mechanism until a threshold force is applied to the locking mechanism, whereupon the biasing member is repositioned along a second axis extending in transverse relation to the first axis.

17. The door assembly of claim 16, wherein the biasing member is configured for contact with the locking mechanism to define a range of relative motion between the locking mechanism and the door body.

18. The door assembly of claim 17, wherein the biasing member includes:

- a first section; and
- a second section spaced inwardly from the first section along a width of the image capture device, wherein the first section and the second section are connected by a flange oriented in generally orthogonal relation thereto.

19. The door assembly of claim 18, wherein the flange is configured for contact with the locking mechanism to limit travel thereof.

20. The door assembly of claim 19, wherein the flange extends into the locking mechanism.

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