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Malone et al.

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(54) **ADJUSTABLE STAND FOR A COMPUTER PERIPHERAL DEVICE**

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F16M 11/12 (2006.01)
G03B 17/56 (2021.01)

(52) **U.S. Cl.**
CPC ***F16M 11/045*** (2013.01); ***F16M 11/046*** (2013.01); ***F16M 11/128*** (2013.01); ***G03B 17/561*** (2013.01); *F16M 2200/024* (2013.01); *F16M 2200/028* (2013.01); *F16M 2200/066* (2013.01)

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CPC .. F16M 11/045; F16M 11/046; F16M 11/128; F16M 2200/024; F16M 2200/028; F16M 2200/066; F16M 13/022; F16M 11/10; F21V 21/26; F21V 21/14
USPC 248/124.1; 362/413, 418–431
See application file for complete search history.

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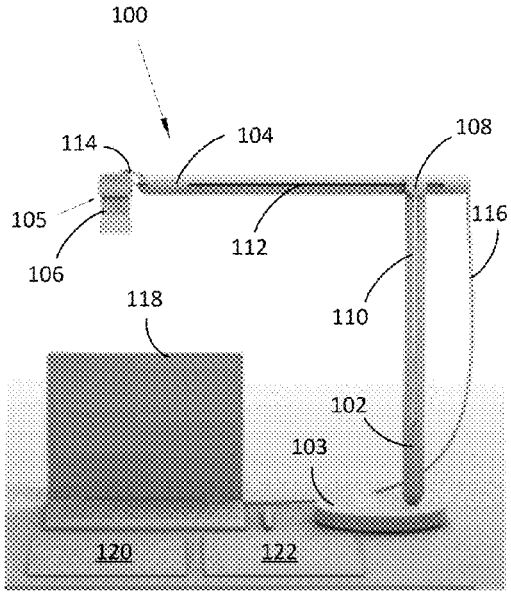
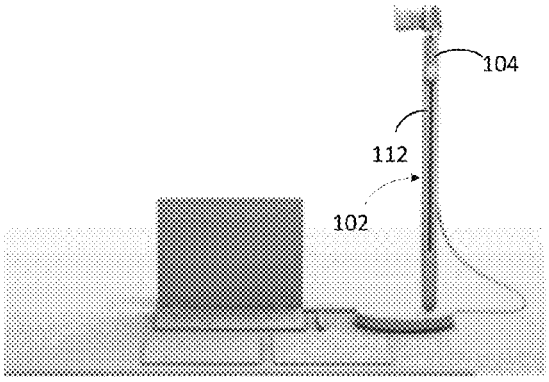
(74) *Attorney, Agent, or Firm* — Kilpatrick Townsend & Stockton LLP

(57) **ABSTRACT**

An adjustable stand for an electronic device that is operable for stable movement in two directions with the use of a single hand of a user. An ergonomic design leverages a natural and intuitive movement of a user's hand to maintain an orientation of the electronic device throughout at least 180 degrees of movement.

15 Claims, 20 Drawing Sheets





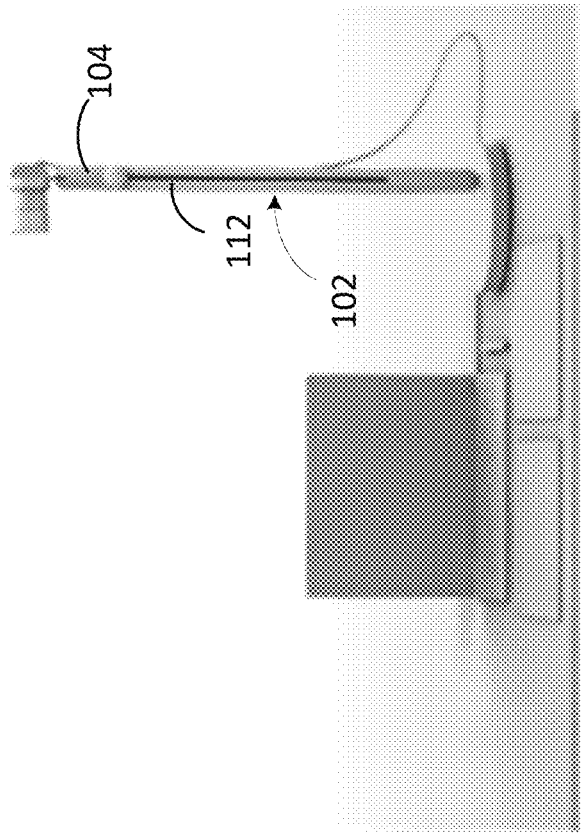

104
112
102

FIG. 1B

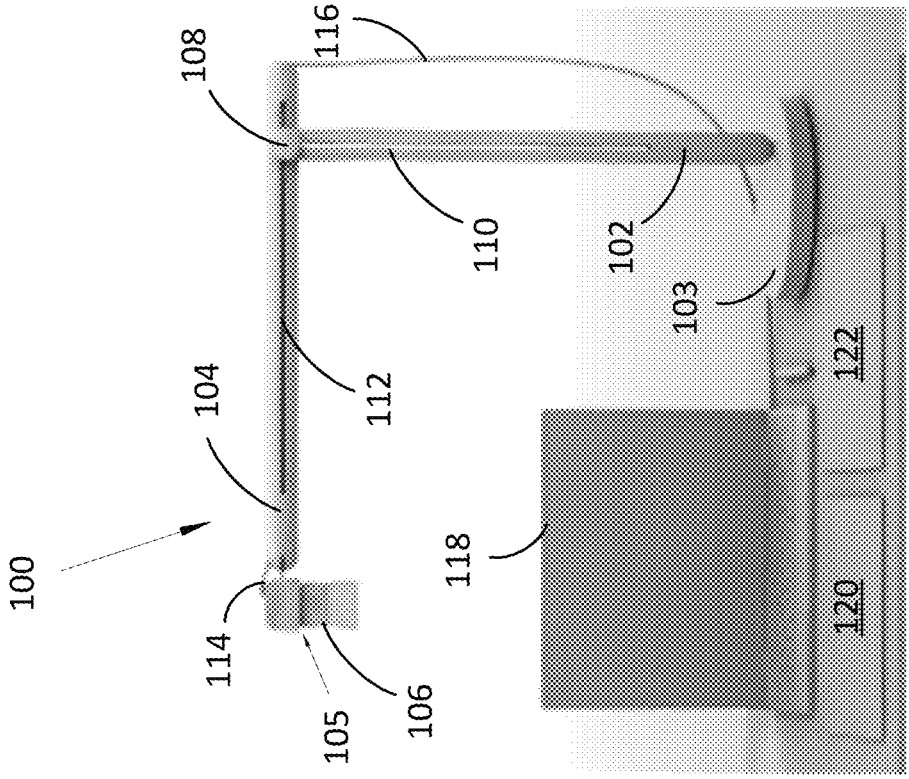

100
114
105
106
104
112
108
116
110
102
103
118
120
122

FIG. 1A

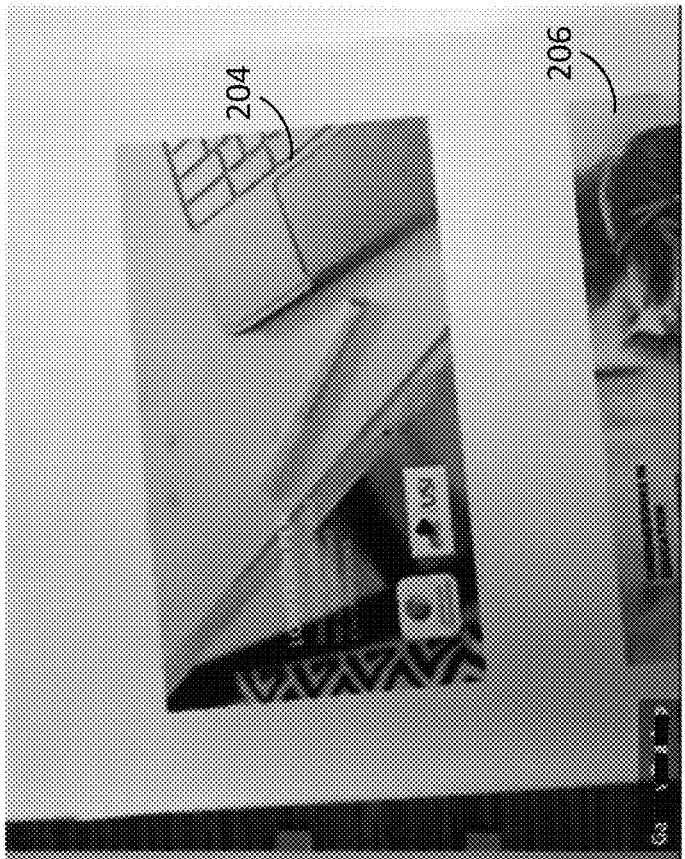


FIG. 2B

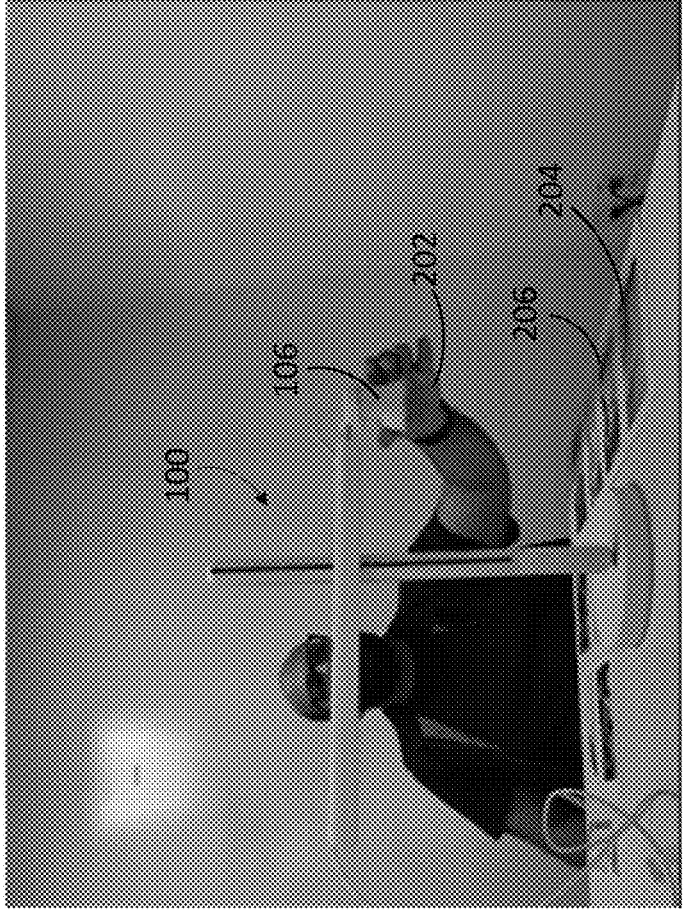


FIG. 2A

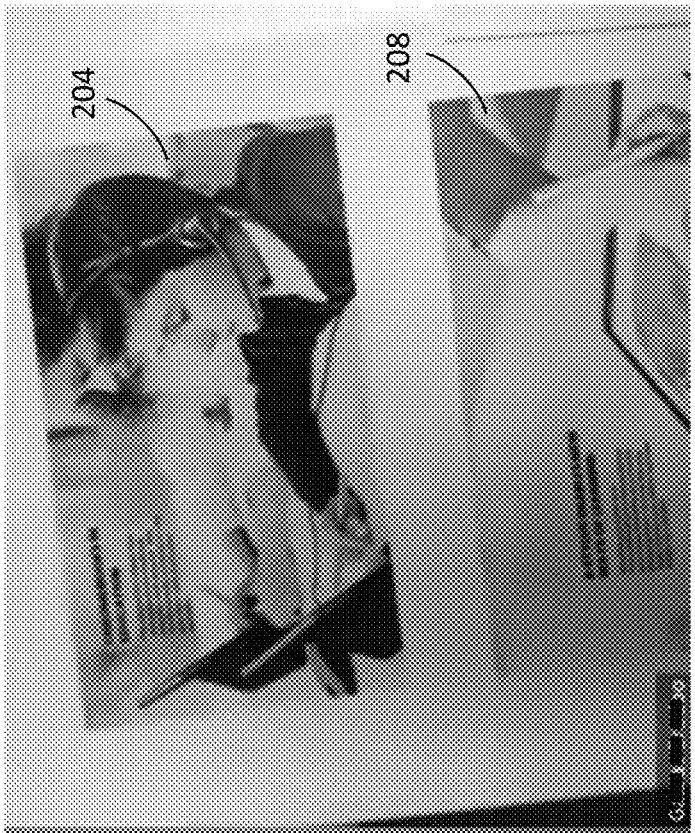


FIG. 2D

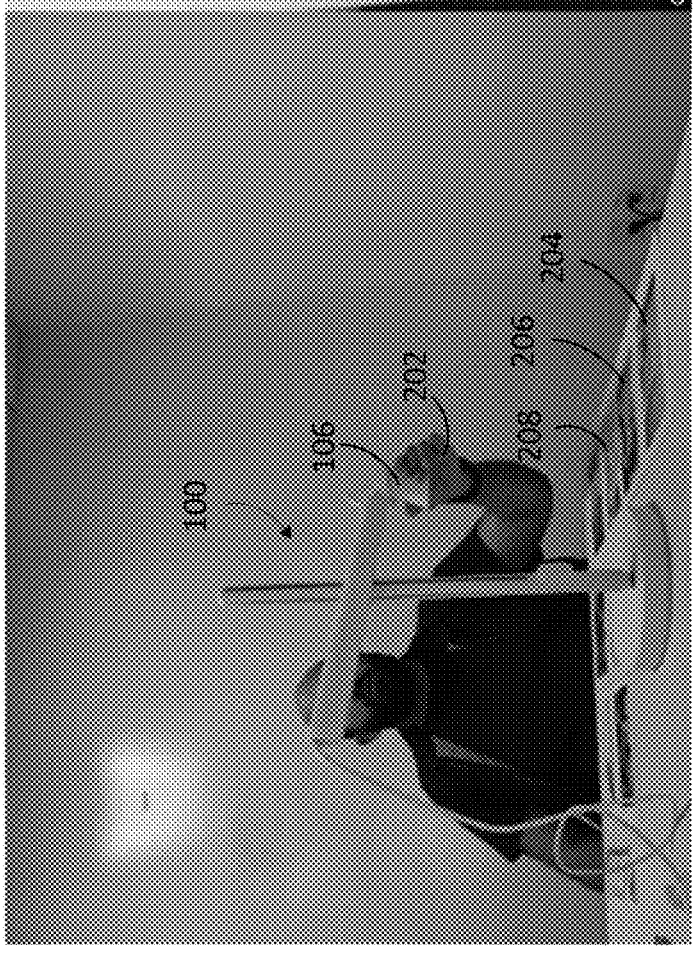


FIG. 2C

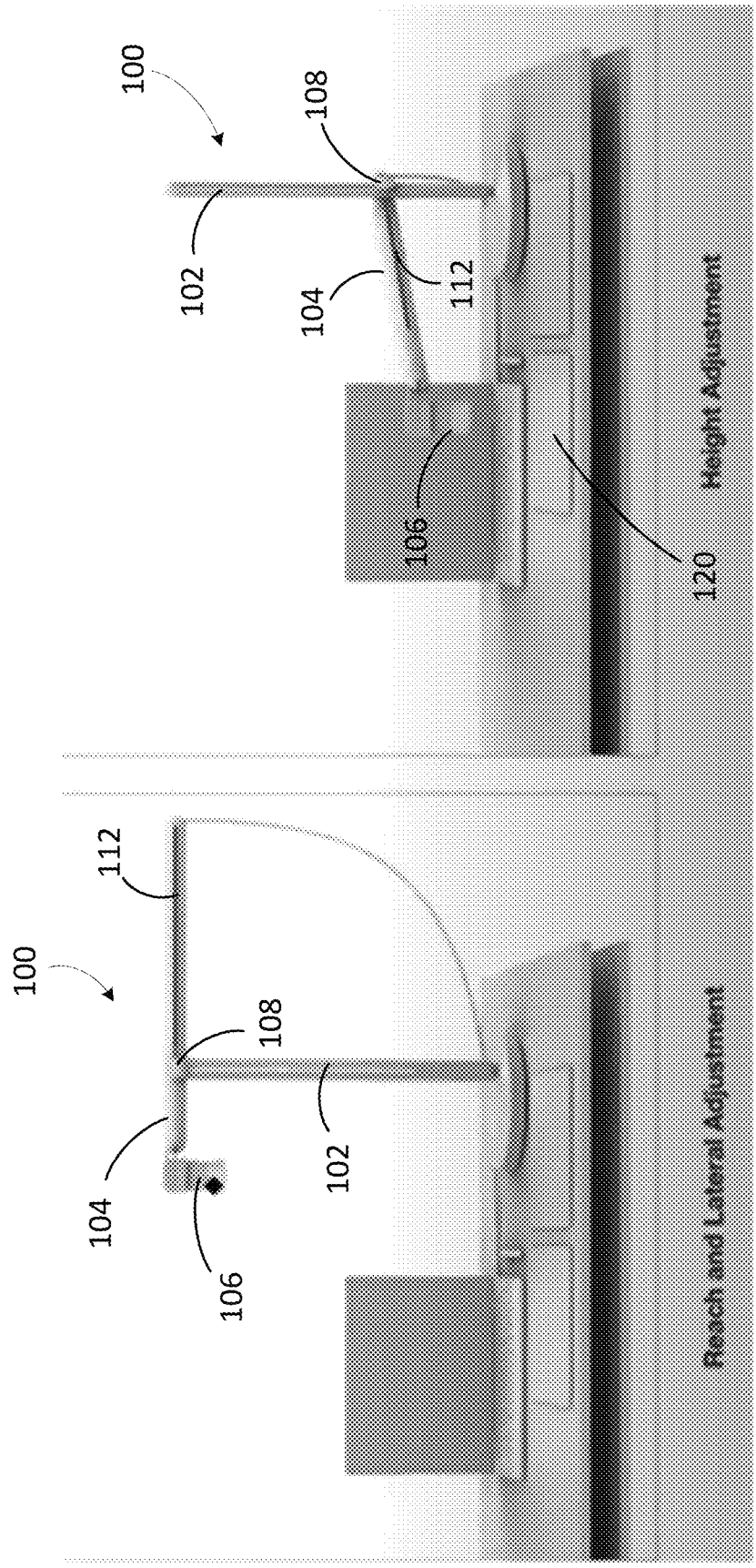

100
108
102
104
112
106
Reach and Lateral Adjustment
100
112
108
104
102
106
Height Adjustment
120

FIG. 3

FIG. 4

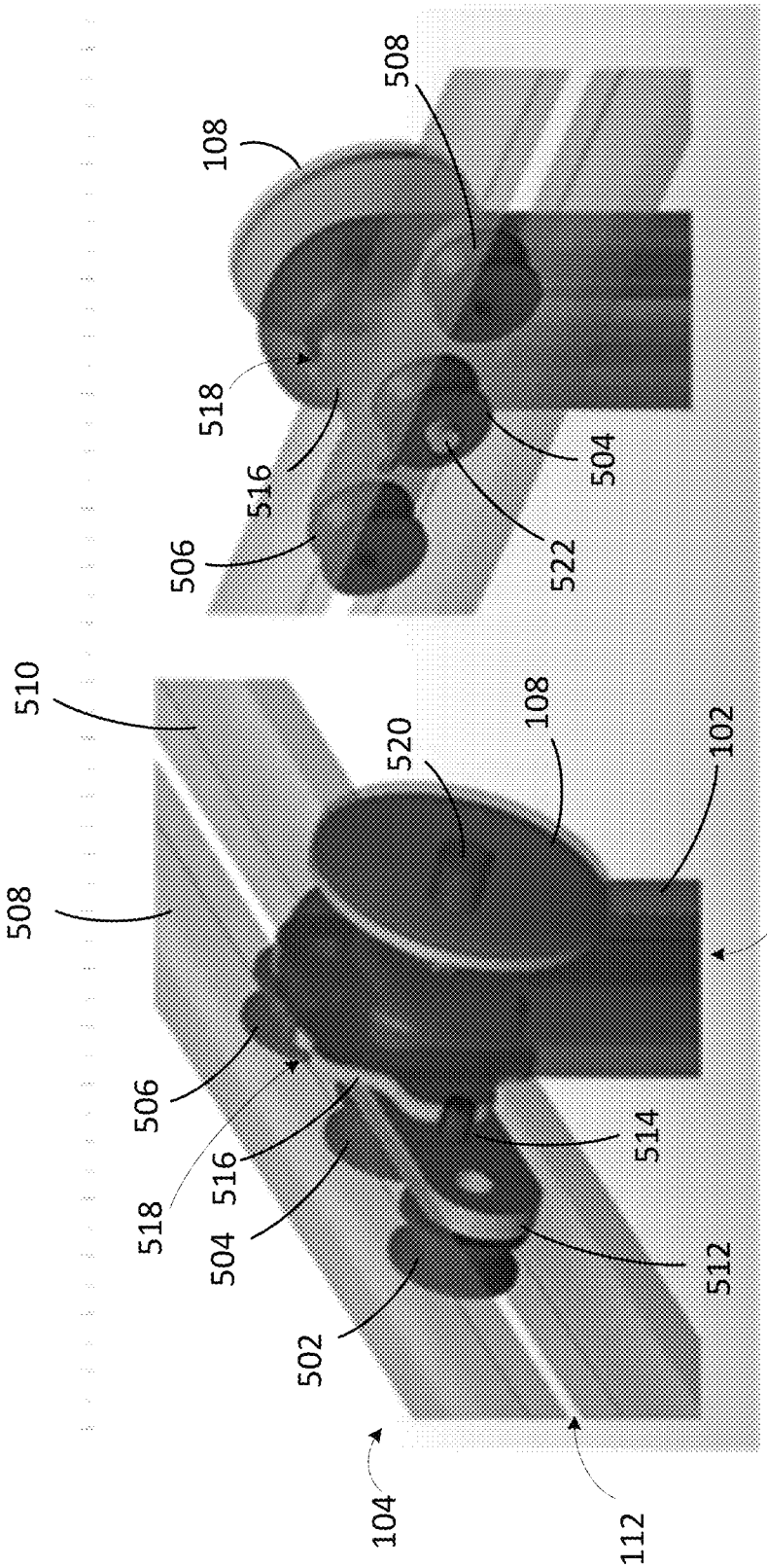

508
108
518
516
506
504
522

FIG. 5B

510
508
506
518
516
504
502
104
520
108
102
110
514
512
112

FIG. 5A

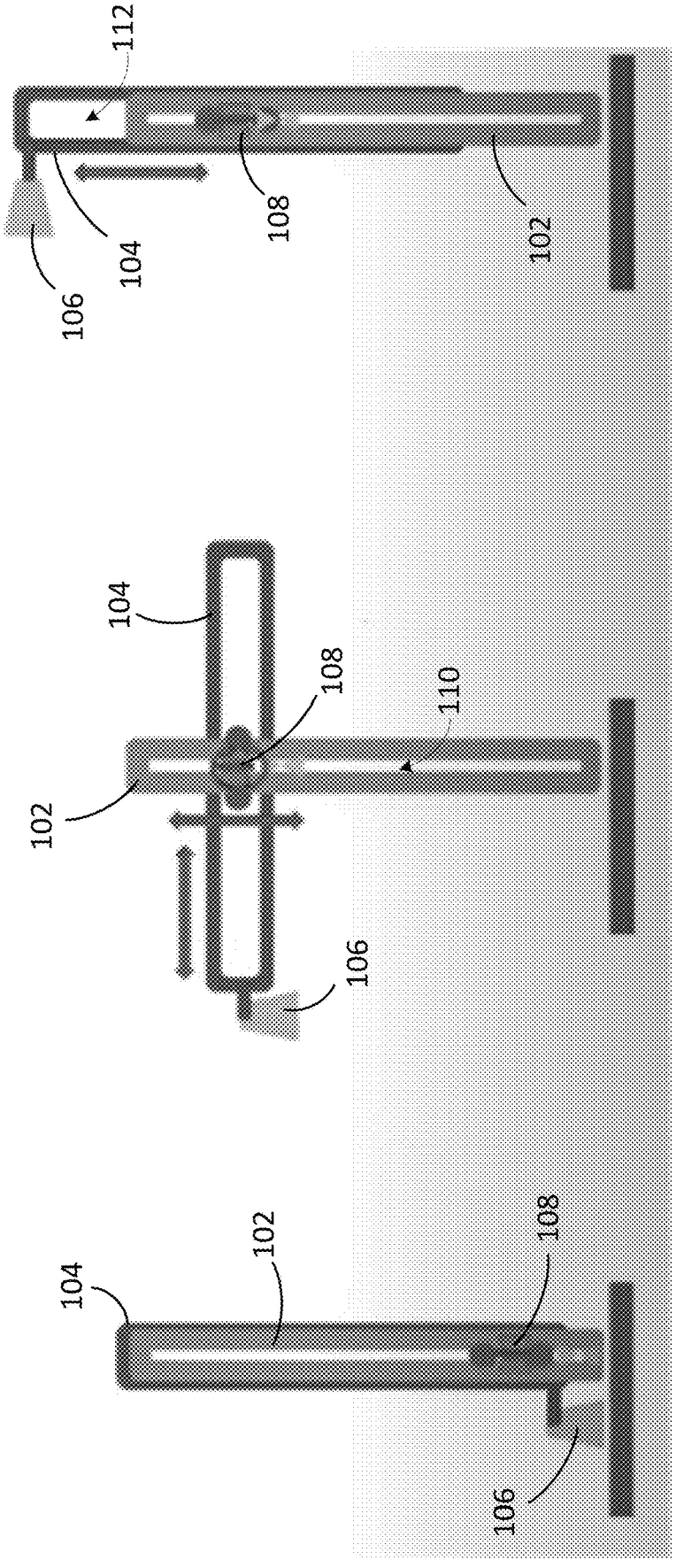


FIG. 6C

FIG. 6B

FIG. 6A

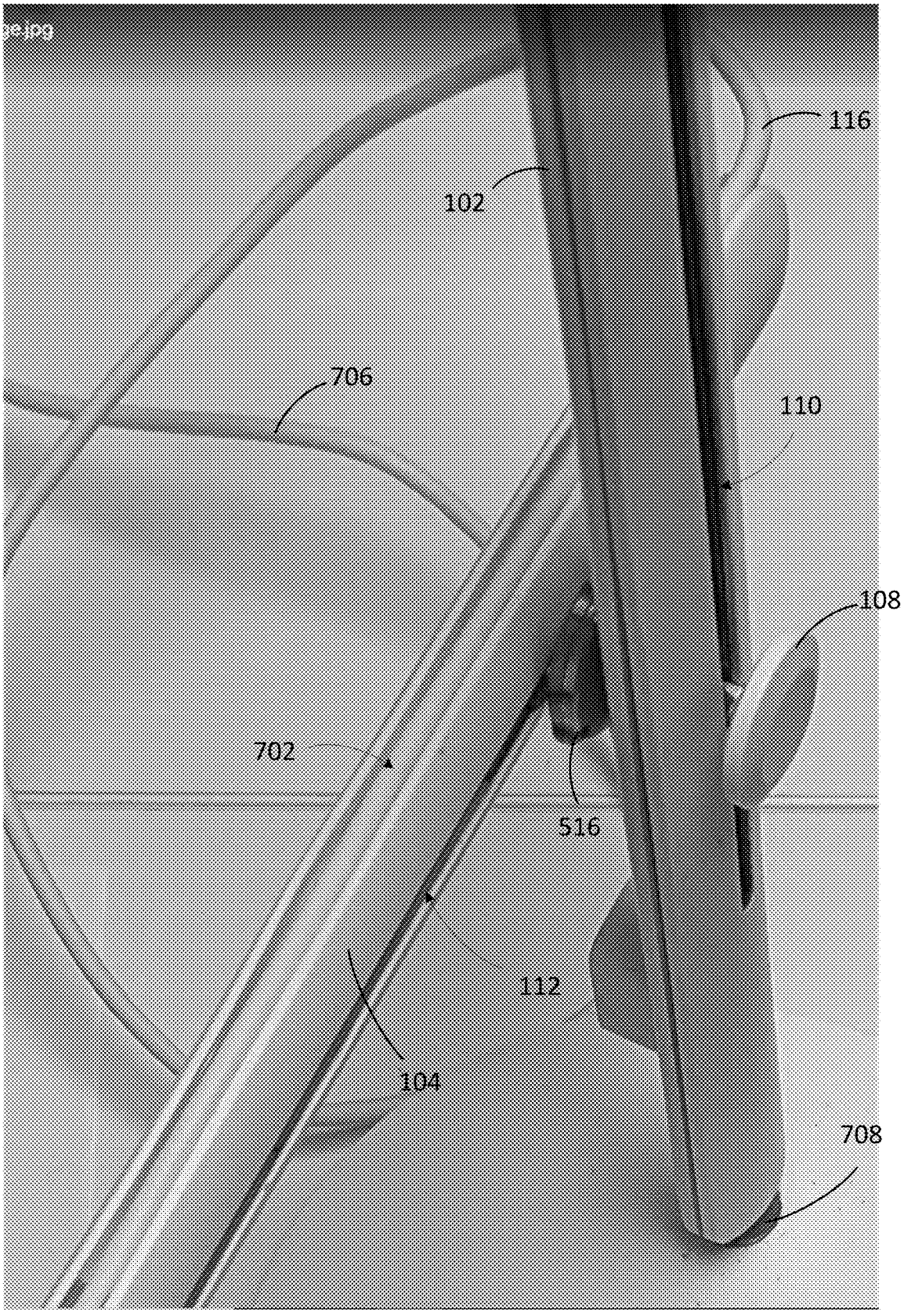


FIG. 7

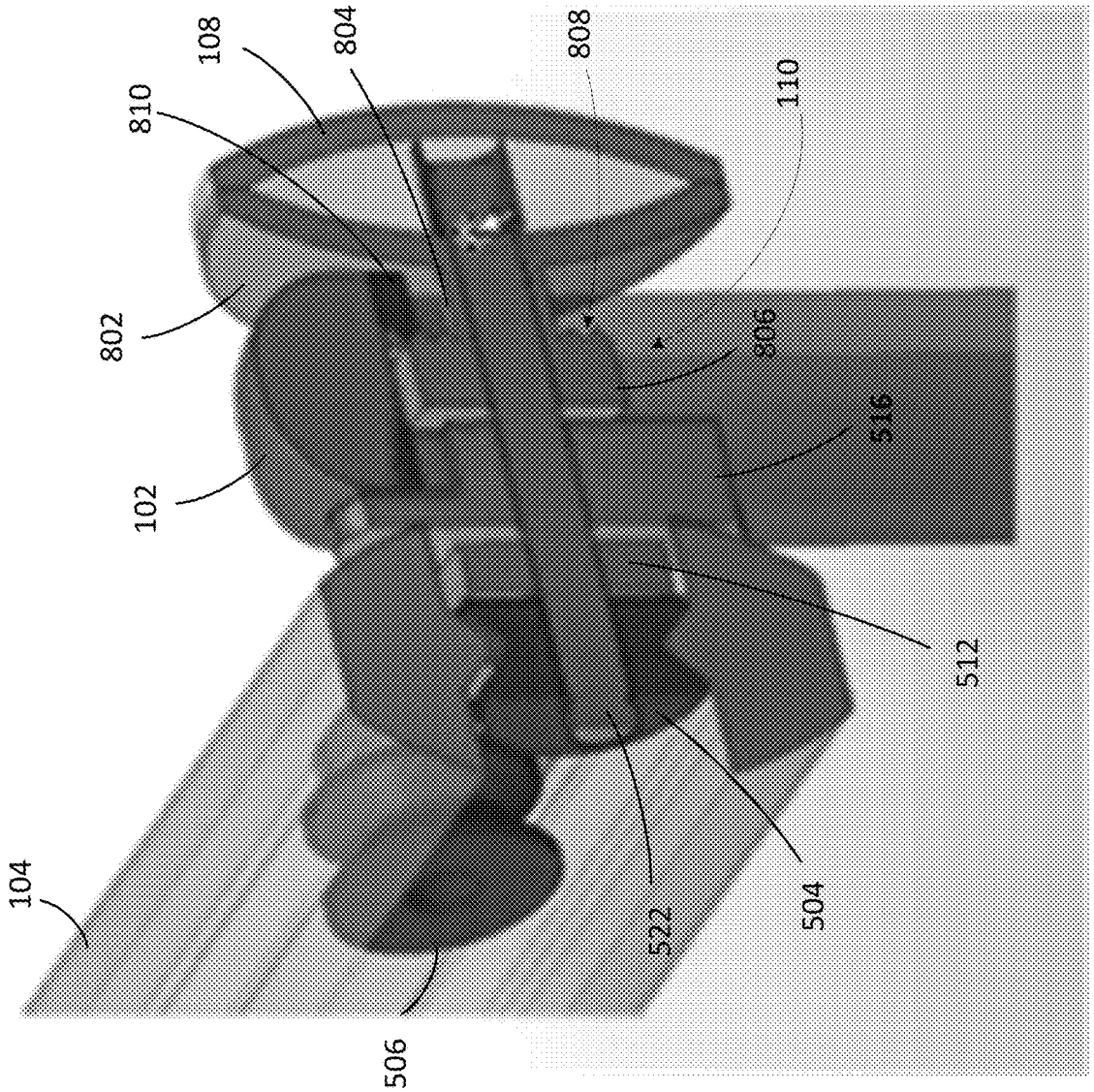


FIG. 8

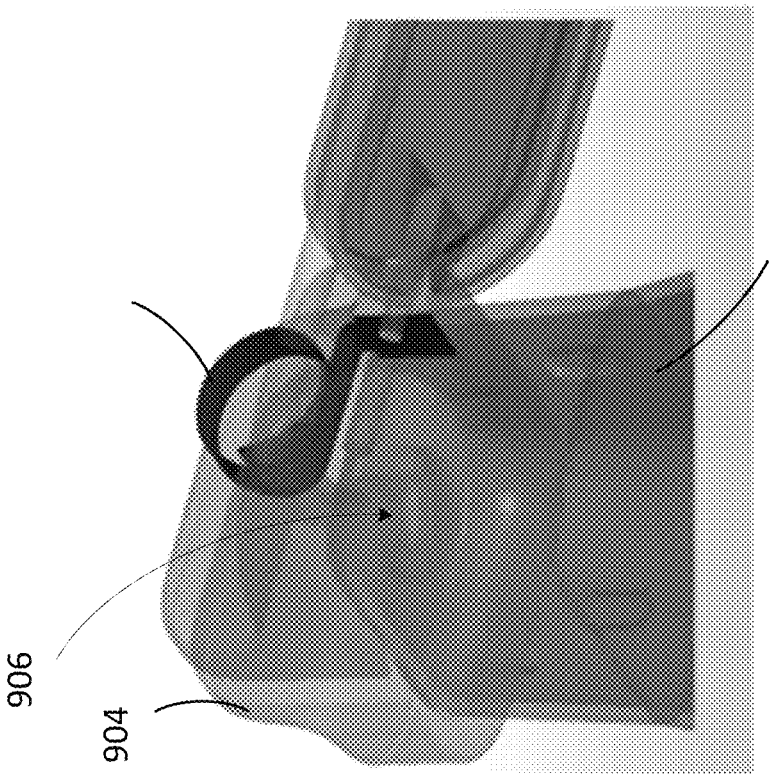


FIG. 9B

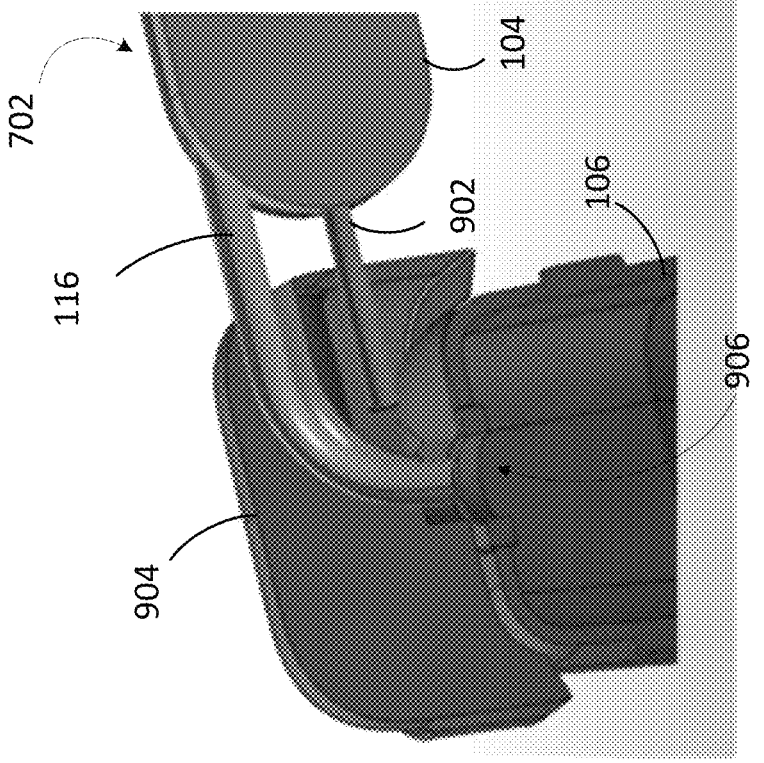


FIG. 9A

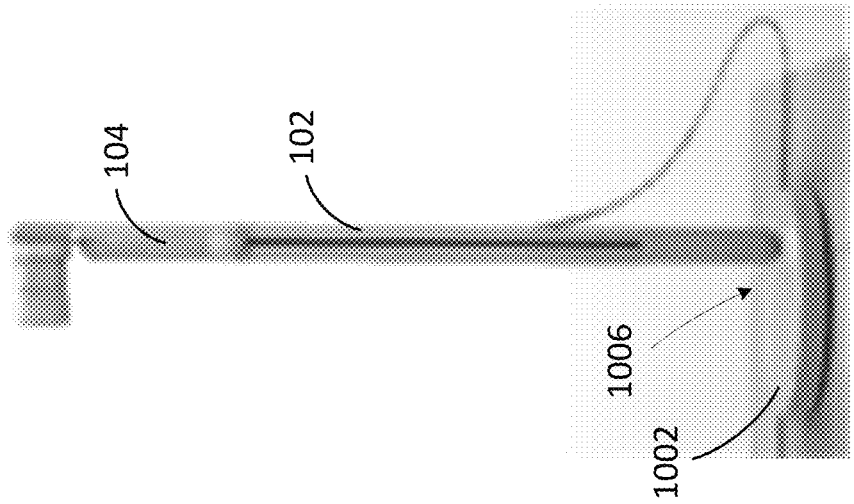


FIG. 10B

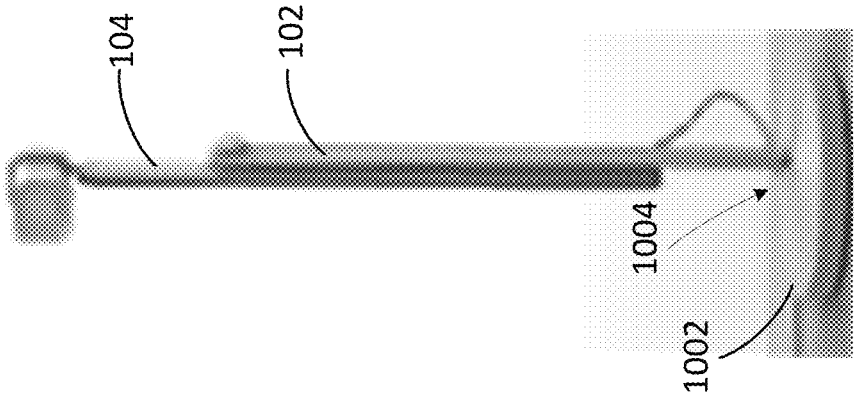


FIG. 10A

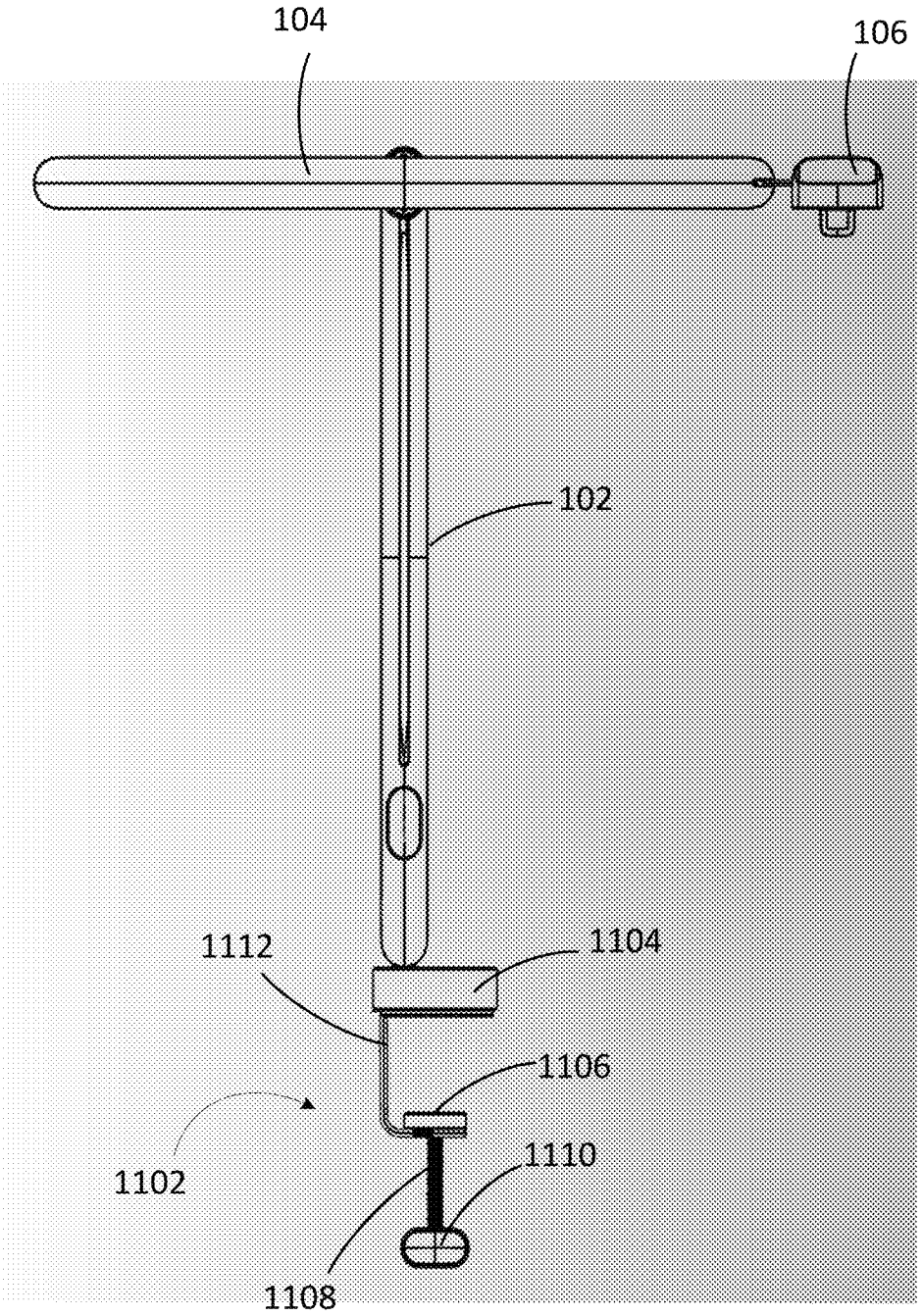


FIG. 11

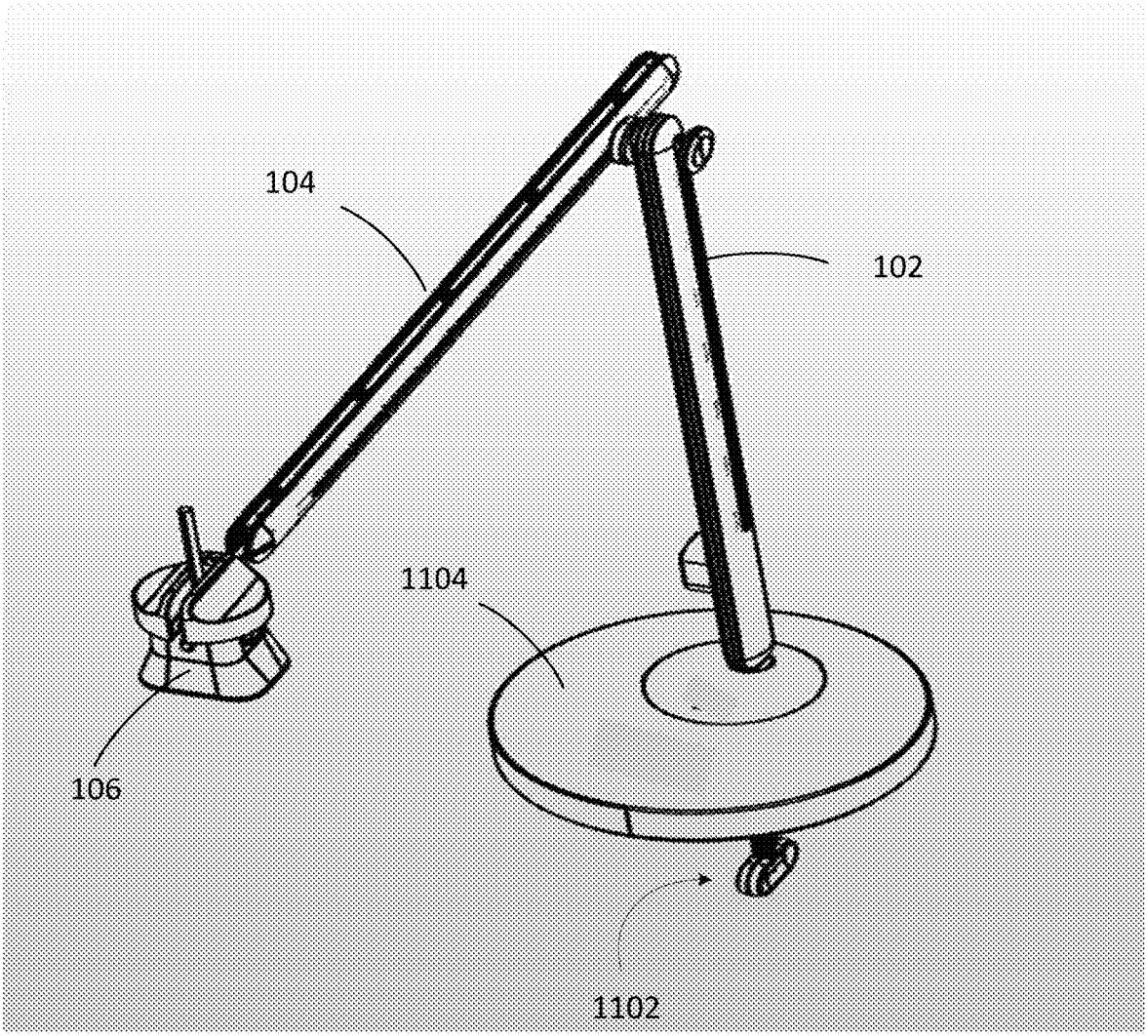


FIG. 12

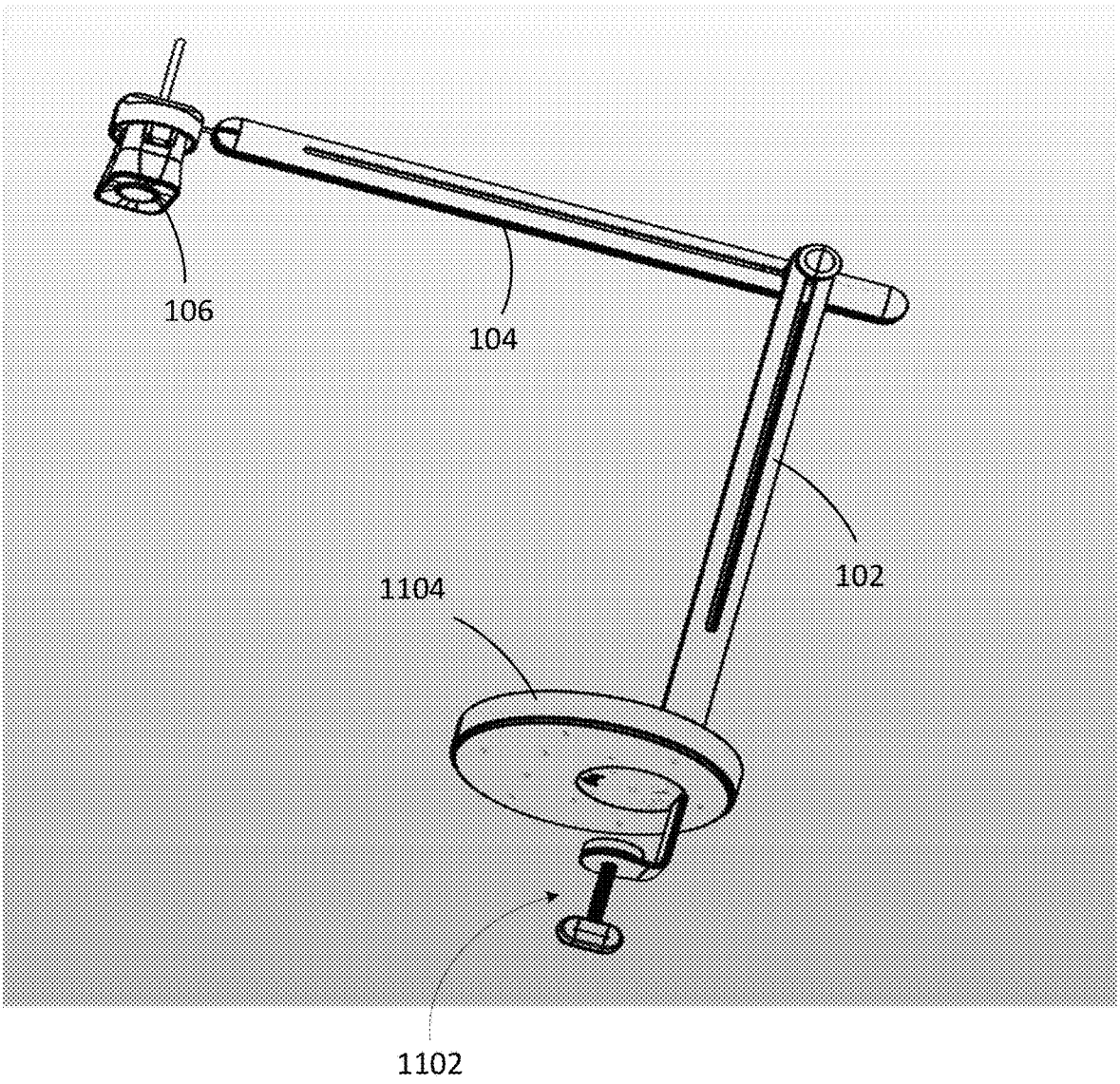


FIG. 13

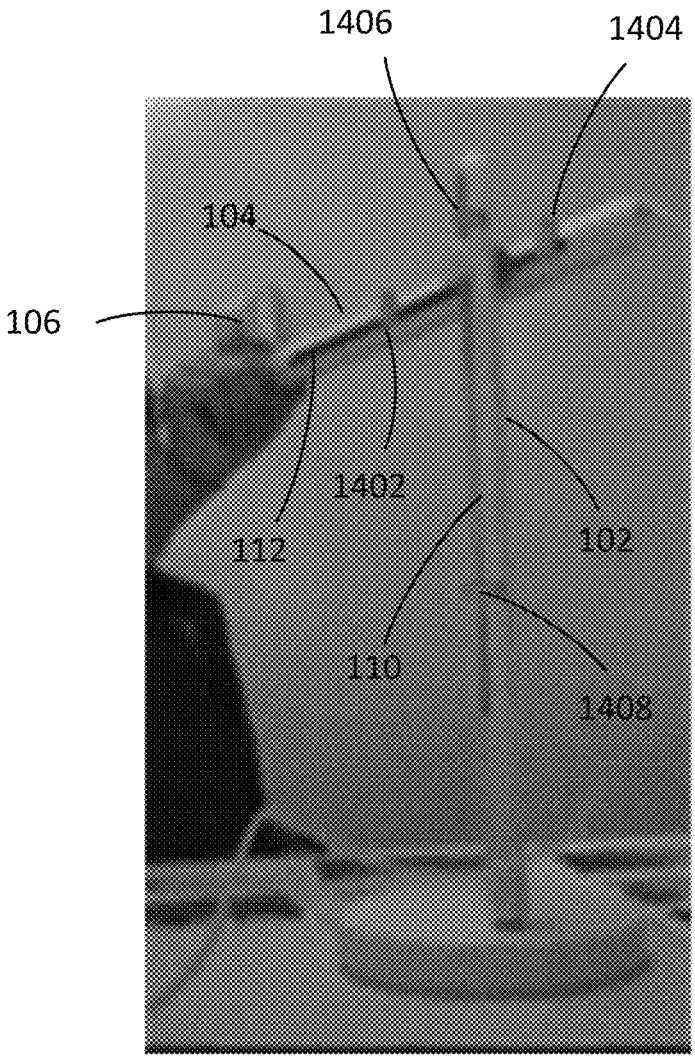


FIG. 14

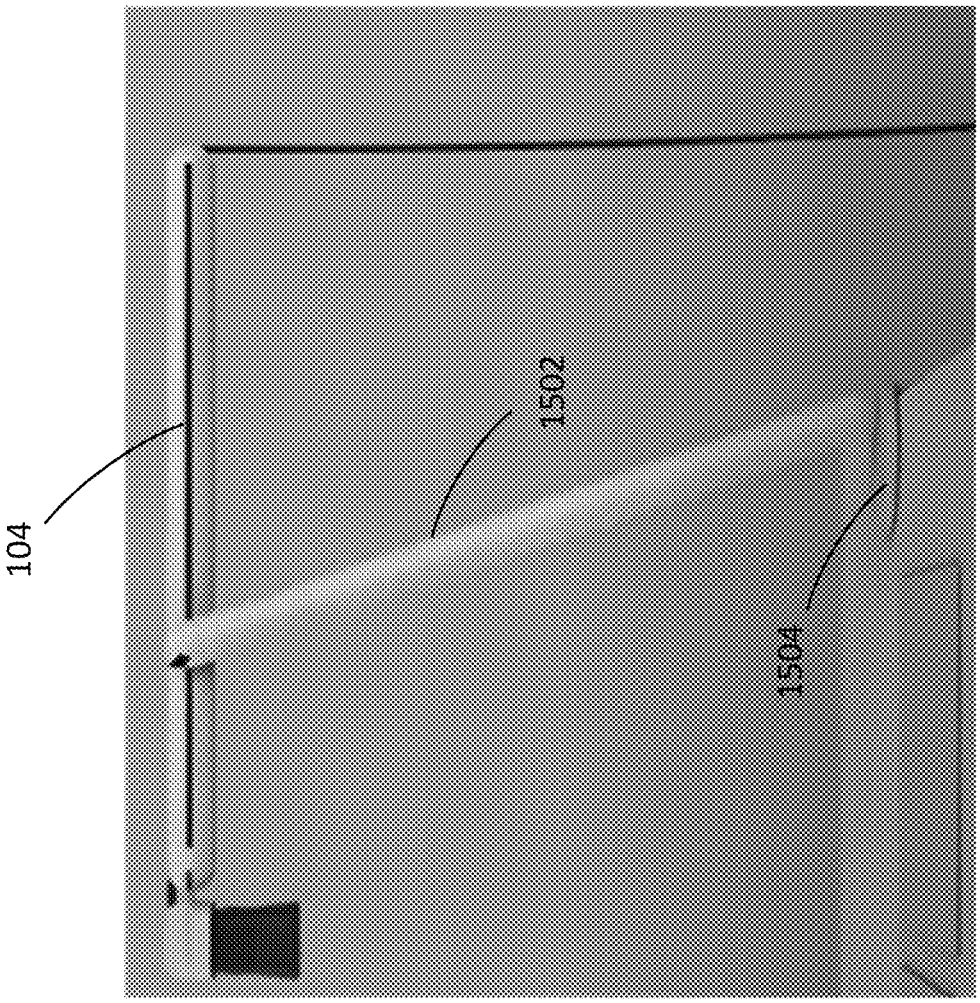


FIG. 15

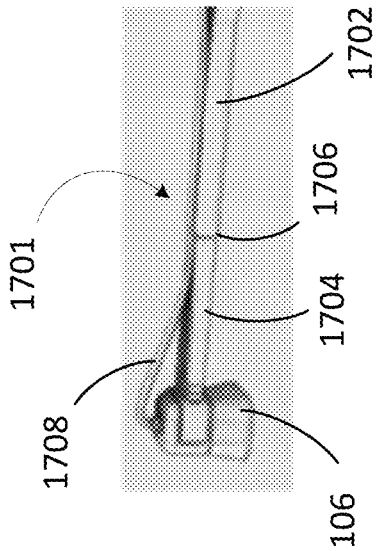


FIG. 16

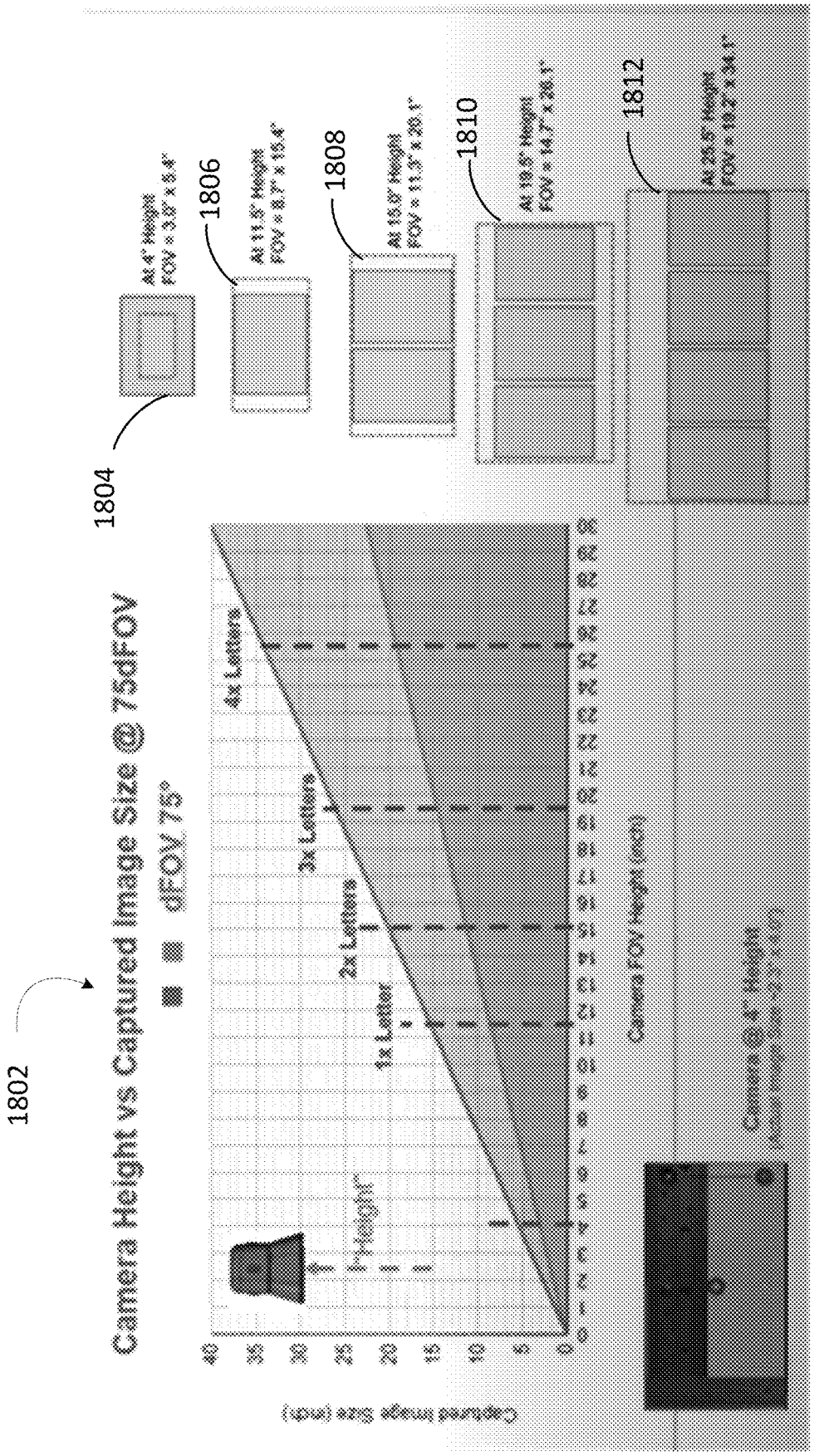

1802
Camera Height vs Captured Image Size @ 75dFOV
dFOV 75°
4x Lenses
3x Lenses
2x Lenses
1x Lense
h Height
Captured Image Size (inch)
Camera FOV Height (inch)
1804
1806
1808
1810
1812

FIG. 17

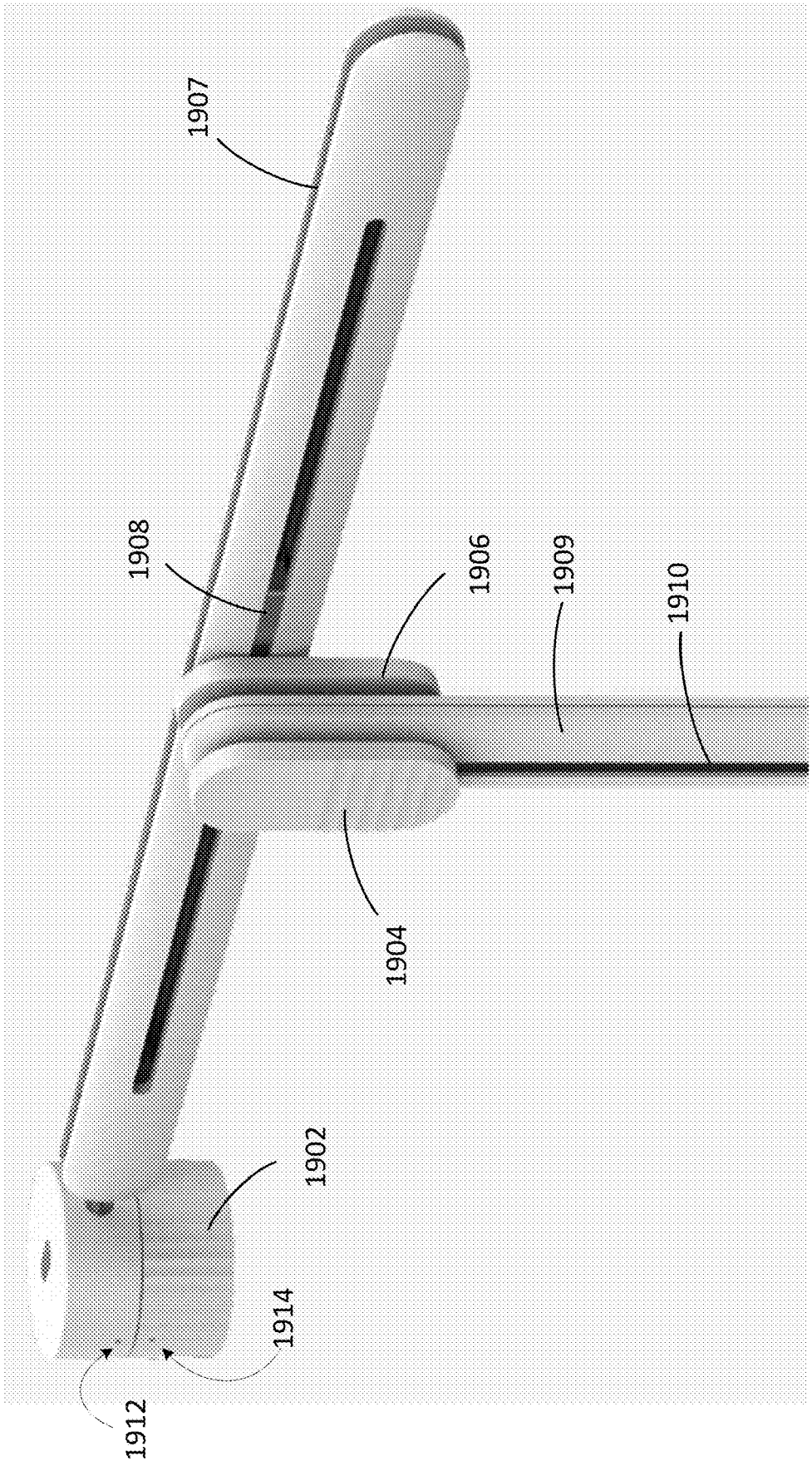


FIG. 18

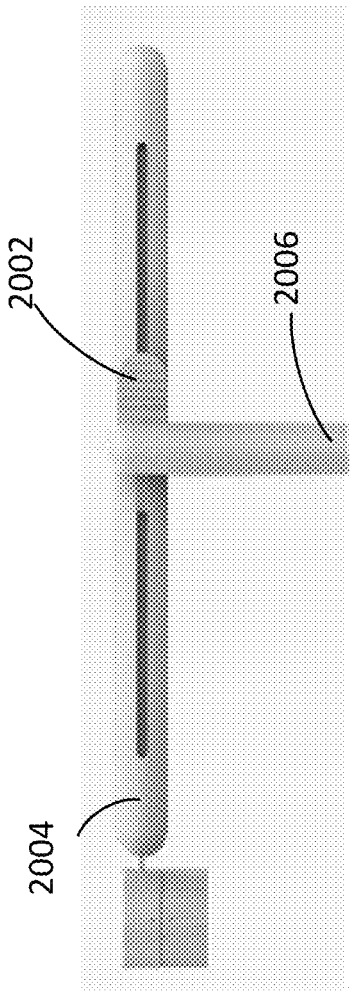


FIG. 19

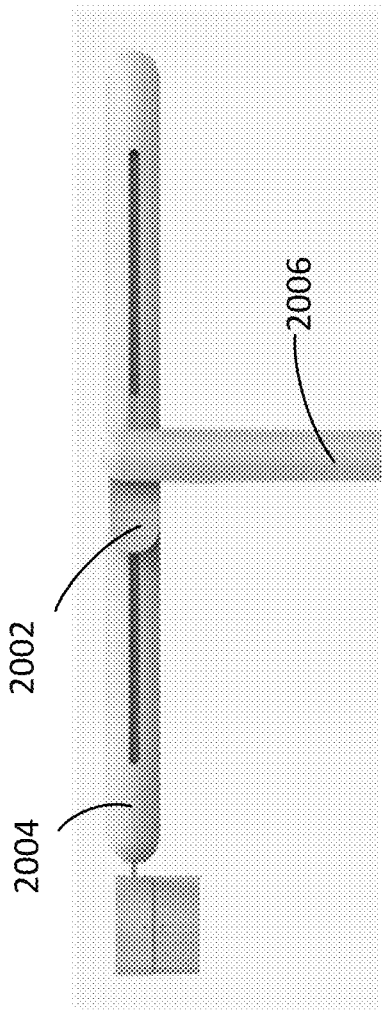


FIG. 20

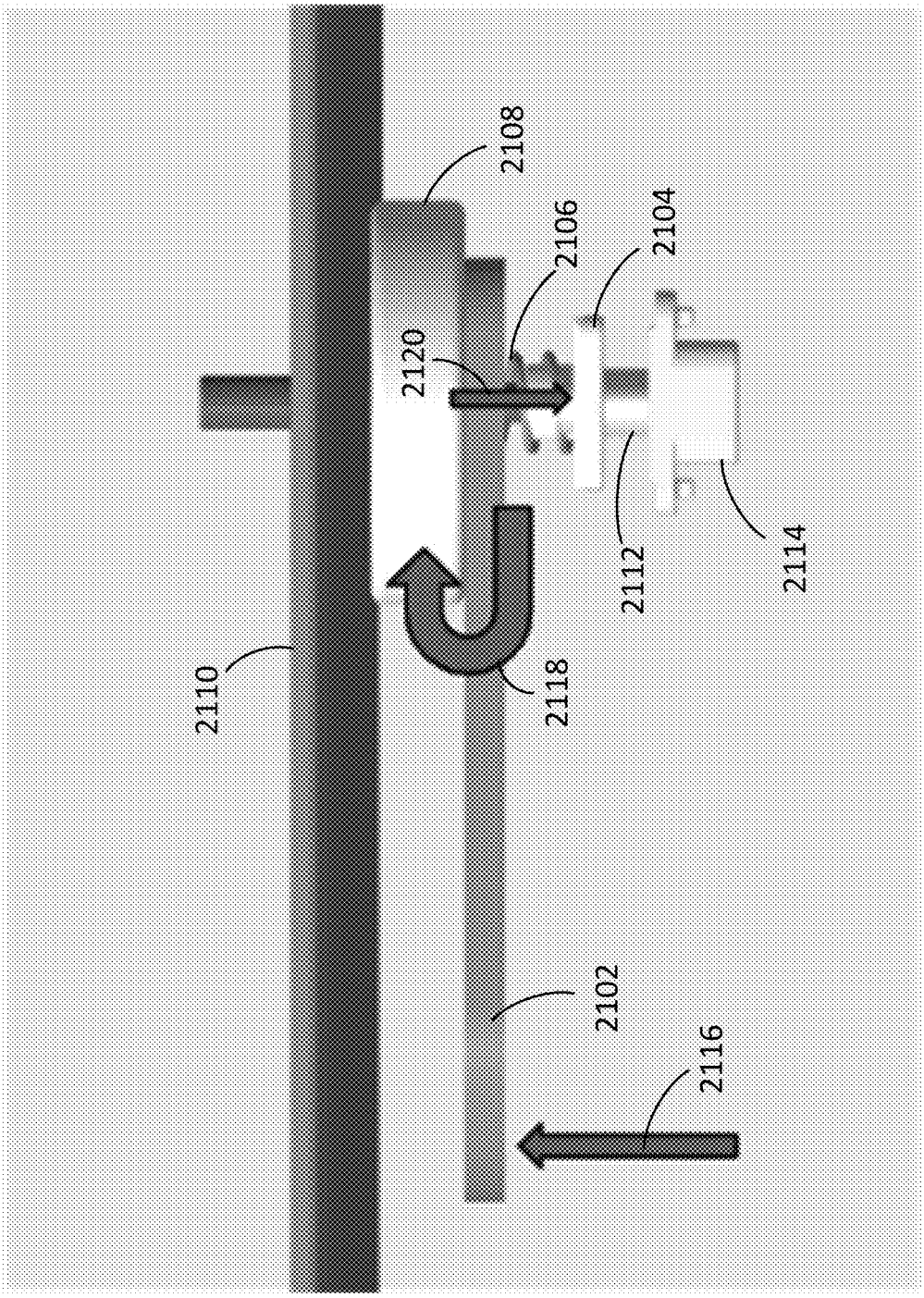


FIG. 21

ADJUSTABLE STAND FOR A COMPUTER PERIPHERAL DEVICE

BACKGROUND OF THE INVENTION

Aspects of the present disclosure relate generally to adjustable stands for computer peripheral devices, such as cameras, according to certain embodiments.

Webcams are typically attached to the top of a computer display with a clamping mechanism. Users sometimes want to provide a view of a written document to the webcam. Users can hold the document up and try to move it within the field of view of the webcam. Alternately, users can remove the webcam from the clamping mechanism, or remove the webcam and clamping mechanism together, and point it downward and move it to over the document. It would be desirable to have a better mechanism for showing documents on a webcam.

Unless otherwise indicated herein, the materials described in this section of the Specification are not prior art to the claims in this application and are not admitted to be prior art by inclusion in this section.

BRIEF SUMMARY OF THE INVENTION

Embodiments provide an adjustable stand for an electronic device that is operable for stable movement in two directions with the use of a single hand of a user. An ergonomic design leverages a natural and intuitive movement of a user's hand to maintain an orientation of the electronic device as it moves to different 3-dimensional positions through the movement of a pole and arm.

In one embodiment, an adjustable stand for an electronic device is provided. The adjustable stand has a base with a pole extending vertically from the base. An arm extends from the pole, the arm being extendable horizontally and being vertically rotatable between a horizontal and vertical position. A clamping mechanism adjusts the height of the arm on the pole. An electronic device is attached to the arm, the electronic device being rotatable at least 180 degrees with respect to the arm.

In one embodiment, the electronic device is a camera. A mechanical zoom function, that is intuitive to a user, is achieved by the user simply grasping the camera and moving it and the arm vertically along the pole.

In one embodiment, the adjustable stand has a pole slot in the pole and an arm slot in the arm. A clamping mechanism extends through the arm slot and the pole slot, allowing movement of the arm horizontally and fixing a vertical position of the arm, but allowing vertical movement of the arm with respect to the pole when the clamping mechanism is released. A button is attached to the clamping mechanism. When the button is depressed, it releases a clamping force of the clamping mechanism on the pole, allowing the arm to slide vertically along the pole slot.

Embodiments provide a method that enables a user to move the camera in a horizontal plane to a desired horizontal position, causing an arm rotatably attached to the camera to rotate to follow the camera position. The arm also extends and retracts with respect to a supporting pole of the adjustable stand. The user can release a clutch mechanism and move the camera vertically to achieve a desired zoom field of view, causing the arm to move vertically along the pole.

This summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used in isolation to determine the scope of the claimed subject matter. The subject matter should be understood by reference to appropriate portions of the entire specification of this disclosure, any or all drawings, and each claim.

The foregoing, together with other features and examples, will be described in more detail below in the following specification, claims, and accompanying drawings.

The terms and expressions that have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof. It is recognized, however, that various modifications are possible within the scope of the systems and methods claimed. Thus, although the present system and methods have been specifically disclosed by examples and optional features, modification and variation of the concepts herein disclosed should be recognized by those skilled in the art, and that such modifications and variations are considered to be within the scope of the systems and methods as defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the various embodiments described above, as well as other features and advantages of certain embodiments of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1**A is a diagram of an adjustable stand in a horizontal position according to certain embodiments;

FIG. **1**B is a diagram of the adjustable stand of FIG. **1**A in a vertical position according to certain embodiments;

FIG. **2**A is a diagram of the adjustable stand of FIG. **1**A in a first position and FIG. **2**B shows the corresponding view of the camera according to certain embodiments;

FIG. **2**C is a diagram of the adjustable stand of FIG. **2**A rotated to bring a different document into view;

FIG. **2**D is a diagram showing the corresponding view of the camera according to certain embodiments;

FIG. **3** is a diagram of the adjustable stand of FIG. **1** illustrating horizontal movement according to certain embodiments;

FIG. **4** is a diagram of the adjustable stand of FIG. **1** illustrating vertical movement according to certain embodiments;

FIGS. **5**A-B are diagrams of a roller mechanism for horizontal movement and support of the arm of the stand, according to certain embodiments;

FIGS. **6**A-C are diagrams illustrating horizontal and vertical movement of a stand, according to certain embodiments;

FIG. **7** is a diagram illustrating a pole and arm attachment mechanism, according to certain embodiments;

FIG. **8** is a cut-away view of the pole and arm attachment mechanism, according to certain embodiments;

FIGS. **9**A-B are diagrams of the attachment of the camera to the arm, according to certain embodiments;

FIGS. **10**A-B are diagrams illustrating movement of the stand pole with a "Lazy Susan" base, according to certain embodiments;

FIG. **11** is a diagram illustrating a clamp support for a stand, according to certain embodiments;

FIG. **12** is a perspective view of a stand with a clamp and a "Lazy Susan" rotating base, according to certain embodiments;

FIG. **13** is a diagram illustrating a pole and arm attachment mechanism, according to certain embodiments;

FIG. **14** is a diagram illustrating a stand with adjustable pole and arm clamps limiting horizontal and vertical movement, according to certain embodiments;

FIG. **15** is a diagram of a stand with an angled pole, according to certain embodiments;

FIG. **16** is a diagram illustrating a telescoping arm for a stand, according to certain embodiments;

FIG. **17** is a graphical illustration of the vertical zoom movement of a stand, according to certain embodiments;

FIG. **18** is a diagram of a camera grab ring and a pole slide mechanism, according to certain embodiments;

FIGS. **19-20** are diagrams of an arm slide mechanism, according to certain embodiments; and

FIG. **21** is a diagram of the details of the slide mechanisms of FIGS. **19** and **20**, according to certain embodiments.

DETAILED DESCRIPTION OF THE INVENTION

Aspects of the present disclosure relate generally to adjustable stands for computer peripheral devices, and in particular for cameras or webcams, according to certain embodiments.

In the following description, various examples of an adjustable stand for computer peripheral devices are described. For purposes of explanation, specific configurations and details are set forth to provide a thorough understanding of the embodiments. However, it will be apparent to one skilled in the art that certain embodiments may be practiced or implemented without every detail disclosed. Furthermore, well-known features may be omitted or simplified to help to prevent any obfuscation of the novel features described herein.

The following high-level summary is intended to provide a basic understanding of some of the novel innovations depicted in the figures and presented in the corresponding descriptions provided below. Aspects of the invention address the problem of a user trying to position a camera to alternately view the user or different documents on a user's desktop.

Aspects of the invention solve this problem by providing an adjustable stand for a camera or other electronic device that allows intuitive positioning by grasping the electronic device and moving it to the desired position, with a supporting arm of the adjustable stand moving with the electronic device.

In one embodiment, an adjustable stand **100**, as shown in FIG. **1**A, for an electronic device is provided. The adjustable stand has a base **103** with a pole **102** extending vertically from the base. An arm **104** extends from the pole, the arm being extendable horizontally and being vertically rotatable between a horizontal and vertical position. A clamping mechanism adjusts the height of the arm on the pole. An electronic device **106** is attached to the arm, the electronic device being rotatable at least 180 degrees with respect to the arm. In one embodiment, the electronic device is a camera, and is rotatable 360 degrees. A mechanical zoom function that is intuitive to a user is achieve by the user simply grasping the camera and moving it vertically along the pole.

Embodiments enable a user to move the camera **106** in a horizontal plane to a desired horizontal position, causing arm **104** to rotate to follow the camera position. The arm also extends and retracts with respect to supporting pole **102** of the adjustable stand. The user can release a clutch mechanism and move the camera vertically to achieve a desired zoom field of view, causing the arm to move vertically along the pole.

In alternate embodiments, the electronic device can be a camera, light, 3D mouse, microphone, etc.

Other examples, embodiments, modifications, etc., are possible and some are described in further detail below.

It is to be understood that this high-level summary is presented to provide the reader with a baseline understanding of some of the novel aspects of the present disclosure and a roadmap to the details that follow. This high-level summary in no way limits the scope of the various embodiments described throughout the detailed description and each of the figures referenced above are further described below in greater detail and in their proper scope.

FIG. **1**A is a diagram of an adjustable stand **100** in a horizontal position according to certain embodiments. A pole **102** extends vertically from a base **103**. The base can include weights to provide stability, such as 800 grams, or between 500 grams and 1 kilogram. An arm **104** extends horizontally from pole **102**. An electronic device **106** (e.g., a camera) is suspended from arm **104**. A clamping mechanism includes a button **108** that releases a clamp inside pole **102** to allow arm **104** to move vertically in a slot **110** in pole **102**. A slot **112** in arm **104** engages an attachment mechanism (not shown) on pole **102**. The attachment mechanism allows the arm to be move horizontally by a user pushing or pulling electronic device **106**. The attachment mechanism also allows arm **104** to be rotated through a range of angles to a vertical position as shown in FIG. **2**.

A cable **114** is connected to electronic device **106** to provide both power and data transfer. The cable runs in a channel in arm **104** and comes out the other end of arm **104** at a cable portion **116**, which can be connected to a computer **118**. In one embodiment, electronic device **106** is a camera or webcam, and can be rotated at least 180 degrees, or 360 degrees using a ball joint **105**, or a donut ring with ball-bearings, or a gooseneck connection, or simply a smooth engagement ring surface to allow rotation. The camera will move counter to the arm, maintaining an image location in the camera's field of view. The camera **106** can be positioned to capture images of papers **120** and **122** on a user's desk.

As can be seen in FIG. **1**A, the camera **106** can also be placed in a classic webcam position to show the user. The arm **104** can be lowered to be at the height of the top of computer **118**. The arm can be moved side-to-side until it is in a middle position over computer **118**. The camera **106** can be rotated so that it is pointed toward the user.

FIG. **1**B is a diagram of the adjustable stand of FIG. **1**A in a vertical position according to certain embodiments. Arm **104** has been rotated 90 degrees from its position in FIG. **1**A to a vertical position, and has been slid down, with button **108** staying stationary while slot **112** moved past it until button **108** is at the other end of slot **112** from the position in FIG. **1**A.

FIG. **2**A is a diagram of the adjustable stand **100** of FIG. **1**A in a first position and FIG. **2**B shows the corresponding view of the camera. As shown, the camera **106** is above an image **204**, which is shown in the camera view of FIG. **2**B. Next to image **204** is a second image **206**. A user's hand **202** can grasp camera **106** to move it over image **206**, as shown in FIGS. **2**C-D.

FIG. **2**C is a diagram of the adjustable stand **100** of FIG. **2**A rotated to bring a different document into view, and FIG. **2**D shows the corresponding view of the camera. As can be seen, the user's hand has pulled the camera **106** closer to the user, with the adjustable stand rotating to follow the user's

hand. The camera has moved from having document **204** in its view, to having the next document **206** in its view, as can be seen from FIG. **2**D. Also, a third document **208** is now partially in view. As can be seen, the orientation of the camera **106** has remained basically the same. In other words, the camera has not rotated with the arm **104** of the stand since the user's hand is holding the camera, causing it to rotate around the ball joint as the arm is rotated.

Thus, the user's natural motion of holding the camera is leveraged by this invention to keep it in the same orientation as the camera stand is rotated. The user's hand and arm act as another arm connected to the camera, fixing it in position and keeping it in generally the same orientation relative to the user. The movement of the camera with the user's hand pulls the arm **104** with it, causing rotation with a movement that is very intuitive to a user. The user simply has to move the camera itself to where the user wants it, and the stand follows. Thus, the user can position the camera where desired using a single hand.

FIG. **3** is a diagram of the adjustable stand **100** of FIG. **1**A illustrating horizontal movement according to certain embodiments. As shown, arm **104** has moved relative to the position in FIG. **1**A, with camera **106** now closer to vertical pole **102**. Arm **104** has moved to the right, so that button **108**, which has not moved, is now at the other end of slot **112**.

FIG. **4** is a diagram of the adjustable stand **100** of FIG. **1**A illustrating vertical movement according to certain embodiments. As can be seen, arm **104** has moved downward so that camera **106** is closer to document **120**. Button **108** has moved downward along a slot in vertical pole **102**. This provides a manual zoom, with the image of document **120** becoming bigger until if fills the entire camera image and then zooms in on an aspect of document **120**. The document stays centered in the field of view of the camera due to the positioning of the arm. Thus, a complex zoom system that requires a user to twist a dial or other mechanism on a camera, at the same time as moving it over the document, is avoided. Rather, the user can operate the zoom intuitively—by moving the camera closer to the document. Arm **104** has also been tilted vertically to the position in FIG. **4**, and is no longer strictly horizontal.

FIGS. **5**A-B are diagrams of a roller mechanism for horizontal movement and support of the arm **104** of the stand **100**, according to certain embodiments. Three rollers **502**, **504** and **506** are mounted to engage with upper member **508** and lower member **510** of arm **104**. The upper and lower members define the slot **112** within which the rollers move. The rollers both support arm **104**, and allow horizontal movement of arm **104** as slot **112** moves across the rollers. Three rollers are used to provide stability for arm **104**, and prevent rocking side-to-side and back-and-forth. Alternately, bearings could be used instead of rollers, or any other mechanism that stably supports the arm and allows horizontal movement and vertical rotation.

The rollers are mounted on an arm plate **512**, which is supported by an axle **520** attached to button **108**. Arm **104** can move horizontally along the rollers, and also rotate vertically around axle **520**. As it rotates, a positioning member (peg) **514** on arm plate **512** can engage one of 4 detents **518** in a clutch plate **516**, to fix it in the most desired positions—exactly horizontal or vertical. In one embodiment, clutch plate **516** is two plates with a metal spring in-between. Alternately, a different number of detents, or no detents, could be used. Detents could be provided every 15, 30 or 45 degrees, for example.

FIG. **5**B is a back-side diagram of the arm support structure of FIG. **5**A. An axle **522** can be seen supporting roller **504**. Axle **522** is connected to axle **520** shown in FIG. **5**A. Button **108** can be pushed inward against a spring mechanism to allow the arm **104** to move vertically in slot **102**. This is described in more detail below.

FIGS. **6**A-C are diagrams illustrating horizontal and vertical movement of a stand, according to certain embodiments. FIG. **6**A shows the stand in a compact position, with arm **104** rotated vertically and moved down to be essentially co-extensive with pole **102**. Button **108**, which fixes arm **104** to pole **102**, is near the bottom, as is the camera **106** at the end of arm **104**. In one embodiment, the camera can have a rechargeable battery that can be inductively charged from a charger in the base of the stand when the camera is in the position shown in FIG. **6**A.

FIG. **6**B shows arm **104** moved upward, which is done by pressing button **108** to release a clamping mechanism inside, then sliding arm **104** up slot **110** in pole **102**. The arm **104** is then rotated to a horizontal position, where a detent is engaged and the button is released to clamp arm **104** at that height. The arm has been slid to the left, so that button **108** is in the middle, moving the arm from its position in FIG. **6**A where the button was at the end of arm **104** near camera **106**.

FIG. **6**C shows arm **104** rotated to the vertical position shown from the horizontal position shown in FIG. **6**B. Arm **104** can move upward in two ways. Button **108** can be depressed to release the clamp, and the button can move the arm upward. Also, with the button holding the arm to a fixed height on pole **102**, arm **104** can be moved upward along its rollers until button **108** is at the low end of slot **112**.

FIG. **7** is a diagram illustrating a pole and arm attachment mechanism, according to certain embodiments. A channel **702** is shown in the top of arm **104**, through which cable **116** can run, so that the cable isn't dangling from the camera. Cable **116** is a DC cable that connects directly to a DC power source, such as a USB port on a computer. In one embodiment, data and power can be provided along the same cable, providing the camera images to the USB or other port of the computer or other computing device. Alternately, the data can be sent wirelessly.

FIG. **7** shows a rotating mechanism **708** that allows pole **102** to rotate 360 degrees with respect to the base. The rotating mechanism can include a ball-bearing ring or rollers or another mechanism. In one embodiment, the camera is powered directly through the arms via contact points in **708** and then a DC-AC connection from the base to a wall outlet, or a USB from the base to computer for power or Power over Ethernet (POE).

FIG. **8** is a cut-away view of the pole and arm attachment mechanism, according to certain embodiments. As described before, rollers **506** and **504** support arm **104** on an arm plate **512**, with middle roller **504** rotating around an axle **522** connected to button **108**, which holds the arm at a certain height on pole **102**. Rotation positions can engage detents in clutch plate **516**. Button **108** has a compressible back portion **802** molded to a support member **804** which supports a block **806**. Block **804** has serrated ridges **808** which engage a complementary surface on the inside of slot **110** of pole **102**. When button **108** is pushed, portion **802** acts like a spring, and compresses, allowing button **108** to push axle **522**, which is connected to block **806** and pushes the serrated ridges **808** away from the complementary ridges of pole **102**, thus disengaging. This allows the arm **104** to move up and down along slot **110** as long as button **108** is pressed. When button **108** is released, compressible back portion **802** pushes outward, pulling the serrated ridges **808** back into

engagement with the corresponding serrated ridges of pole **102**, fixing arm **104** at that height. Alternately, axle **522** may only extend to arm plate **512** and the rollers have a separate shaft to roll on.

FIGS. **9**A-B are diagrams of the attachment of the camera to the arm, according to certain embodiments. A rod **902** extends from arm **104** to attach to camera holder **904** and allows rotation around the axis of the rod **902**. The camera is also connected to the camera holder **904** by a ball joint, ball-bearing ring or other mechanism, not shown in this view, which allows rotation around an axis perpendicular to rod **902**. A connection of the cable **116** to the camera, not shown, has slack to allow the camera (in the holder) to rotate with respect to the arm without causing the cable to disconnect or tear. Cable **116** extends through a hole **906** in cap **904** to connect to camera **106**.

FIGS. **10**A-B are diagrams illustrating movement of the stand pole with a "Lazy Susan" base, according to certain embodiments. The arm **104** is arranged in a vertical position with respect to pole **102**. Base **1002** rotates, in a "Lazy Susan" arrangement, with pole **102** moving around the perimeter of base **1002** from a position **1004** in FIG. **10**A to a position **1006** in FIG.

FIG. **11** is a diagram illustrating a clamp support for a stand, according to certain embodiments. A clamp **1102** can hold a base **1104** on the edge of a desk. The clamp has a bottom part **1106** supported by a bracket **1112**, that can be screwed upward with a screw **1108** by turning a handle **1106**. Base **1104** can be any type of base, and can allow rotation, such as by the Lazy Susan arrangement shown in FIGS. **10**A-B.

FIG. **12** is a perspective view of a stand with a clamp **1102** and a "Lazy Susan" rotating base **1104**, according to certain embodiments.

FIG. **13** is a diagram illustrating the clamp and Lazy Susan arrangement of FIG. **12** from below, according to certain embodiments.

FIG. **14** is a diagram illustrating a stand with adjustable pole and arm clamps limiting horizontal and vertical movement, according to certain embodiments. Arm clamps **1402** and **1404** slide within slot **112** of arm **104** to desired limit positions set by a user. Similarly, pole clamps **1406** and **1408** slide within slot **110** of pole **102** to desired positions to limit vertical travel. The arm and pole clamps can have a similar mechanism to button **108**, described earlier. A user may want to limit travel to keep the camera over a designated document area on a desk, or to keep the arm from hitting a nearby wall, or for any other reason. In an alternate embodiment, instead of clamps, detents can be used at the clamp positions, and at additional positions. The detents urge the arm into that position, but allow the arm to be pushed beyond the detent, or pulled away from it. The detents provide tactile feedback to the user on a maximum advisable position or optimum positions for different uses.

FIG. **15** is a diagram of a stand with an angled pole **1502**, according to certain embodiments. Pole **1502** can tilt upward or downward, providing the height adjustment in this manner. The pole **1502** could still rotate, either around where it is connected to base **1504**, or in a Lazy Susan or other arrangement.

FIG. **16** is a diagram illustrating a telescoping arm for a stand, according to certain embodiments. Camera **106** is held by arm **1701**, which has a first arm **1702** with a second arm **1704** which telescopes in and out of first arm **1702** at an opening **1706**. Cable **1708** has sufficient slack to be able to extend to the camera **106** when second arm **1704** is in the fully extended position. In alternate embodiments, a third telescoping arm could be added. Additionally, or instead, the pole could be telescoping. The telescoping arm can be added to the tilted pole of FIG. **15**, or to any of the other embodiments herein.

FIG. **17** is a graphical illustration of the vertical zoom movement of a stand, according to certain embodiments. A graph **1802** shows that as the height of the camera is raised, the field of view (FOV) of the camera increases. Conversely, as the camera is lowered, the FOV decreases, giving a close-up view. This, raising and lowering the camera gives a zoom feature that is intuitive and easy for a user. The images on the right illustrate the FOV of the camera at different heights in one embodiment. Image **1804**, at a height of 4 inches, provides a FOV sufficient for a business card. Image **1806**, at a height of 11.5 inches, provides a FOV sufficient for a standard 8½×11 inch letter paper, with a FOV of 8.7×15.4 inches. An image **1808** at a height of 13 inches provides a FOV sufficient for 2 letter documents, with a FOV of 11.3×20.1 inches. An image **1810** at a height of 19.5 inches provides a FOV sufficient for 3 letter documents, with a FOV of 14.7×26.1 inches. An image **1812** at a height of 25.5 inches provides a FOV sufficient for 4 letter documents, with a FOV of 19.2×34.1 inches.

Alternate Clamp Embodiments

FIG. **18** is a diagram of a camera grab ring and a pole slide mechanism, according to certain embodiments. A grab ring **1902** has outer serrations to provide a friction surface for the user to grasp. Indicators **1912** and **1914** show an initial camera position. As grab ring **1902** is rotated, indicator **1914** on the grab ring will move with respect to indicator **1912**, giving visual feedback to the user of the amount of rotation. This also allows the user to return the camera to the original position by aligning the indicators again.

Two slide tabs **1904** and **1906** are shown as part of a pole slide mechanism. Tab **1906** is connected to a block **1908** in the arm **1907** to hold the arm. When tabs **1904** and **1906** are pinched together, the arm can slide up and down the pole **1909** along slot **1910**.

FIGS. **19-20** are diagrams of an arm slide mechanism, according to certain embodiments. FIG. **19** shows arm slide lever **2002** in one embodiment, to the right of pole **2006** along arm **2004**. FIG. **20**B shows the arm lever in an alternative embodiment to the left of the pole **2006**. The user can hold the arm **2004** and pinch the lever **2002** into the arm **2004** releasing a mechanism that allows the used to move the arm **2004** along pole **2006**. When the lever **2002** is released, the mechanism is engaged keeping the arm **2004** at the height along the pole where it was left.

FIG. **21** is a diagram of the details of the slide mechanisms of FIGS. **19** and **20**, according to certain embodiments. A tab **2102** is biased by a plate **2104** and spring **2106** to pressure a block **2108** against and arm or pole **2110**. These elements are mounted on a rod **2112** which is anchored in a block **2114**. When a user pinches tab **2102**, as indicated by arrow **2116**, tab **2102** rotates about the edge of block **2108** as indicated by arrow **2118**, causing an end of tab **2102** to move downward as indicated by arrow **2120**, compressing spring **2106**. This lessens the pressure on arm or pole **2110**, allowing movement vertically along rod **2112**.

In one embodiment, a switch is provided on the camera to rotate between portrait and landscape FOV. In another embodiment, the camera has a light (e.g, a ring light) for illuminating not only a user's face, but also documents. In other embodiments, haptic or vibration feedback is provided for when document is optimally in field of view. Software code in a camera application on the computer determines when the document is within the field of view, by detecting

the document separately from the desktop, as is done for scanning applications. In an alternate embodiment, the camera can slide along the arm, instead of the arm sliding with respect to the pole.

Numerous specific details are set forth herein to provide a thorough understanding of the claimed subject matter. However, those skilled in the art will understand that the claimed subject matter may be practiced without these specific details. In other instances, methods, apparatuses, or systems that would be known by one of ordinary skill have not been described in detail so as not to obscure claimed subject matter. The various embodiments illustrated and described are provided merely as examples to illustrate various features of the claims. However, features shown and described with respect to any given embodiment are not necessarily limited to the associated embodiment and may be used or combined with other embodiments that are shown and described. Further, the claims are not intended to be limited by any one example embodiment.

While the present subject matter has been described in detail with respect to specific embodiments thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing may readily produce alterations to, variations of, and equivalents to such embodiments. Accordingly, it should be understood that the present disclosure has been presented for purposes of example rather than limitation, and does not preclude inclusion of such modifications, variations, and/or additions to the present subject matter as would be readily apparent to one of ordinary skill in the art. Indeed, the methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the methods and systems described herein may be made without departing from the spirit of the present disclosure. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the present disclosure.

Although the present disclosure provides certain example embodiments and applications, other embodiments that are apparent to those of ordinary skill in the art, including embodiments which do not provide all of the features and advantages set forth herein, are also within the scope of this disclosure. Accordingly, the scope of the present disclosure is intended to be defined only by reference to the appended claims.

Conditional language used herein, such as, among others, "can," "could," "might," "may," "e.g.," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain examples include, while other examples do not include, certain features, elements, and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or more examples or that one or more examples necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular example.

The terms "comprising," "including," "having," and the like are synonymous and are used inclusively, in an open-ended fashion, and do not exclude additional elements, features, acts, operations, and so forth. Also, the term "or" is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term "or" means one, some, or all of the elements in the list. The use of "adapted to" or "configured to" herein is meant as open and inclusive language that does not foreclose devices adapted to or configured to perform additional tasks or steps. Additionally, the use of "based on" is meant to be open and inclusive, in that a process, step, calculation, or other action "based on" one or more recited conditions or values may, in practice, be based on additional conditions or values beyond those recited. Similarly, the use of "based at least in part on" is meant to be open and inclusive, in that a process, step, calculation, or other action "based at least in part on" one or more recited conditions or values may, in practice, be based on additional conditions or values beyond those recited. Headings, lists, and numbering included herein are for ease of explanation only and are not meant to be limiting.

What is claimed is:

1. An adjustable stand, comprising:
a base:
a pole extending from the base;
an arm extending from the pole, the arm being extendable rotatable;
a clamp for adjusting a position of the arm on the pole;
an electronic device attached to the arm, the electronic device being able to move to different 3-dimensional position in an area through a movement of the pole and the arm;
an arm slot in the arm;
at least three rollers mounted in the arm slot, allowing movement of the arm across the rollers;
an arm plate supporting the rollers on axles allowing rotation of the rollers;
a support member connected to and supporting the plate, the support member being coupled to the pole.

2. The adjustable stand of claim **1** wherein the electronic device is a camera.

3. The adjustable stand of claim **2** further comprising a grab ring connected to the camera, wherein movement of the grab ring by a user causes the camera to move and the arm to follow and move and rotate with respect to the camera.

4. The adjustable stand of claim **1** further comprising:
a pole slot in the pole;
the clamp extending through the arm slot and the pole slot, allowing movement of the arm horizontally and fixing a position but allowing movement of the arm with respect to the pole when the clamp is released.

5. The adjustable stand of claim **4** further comprising a button attached to the clamp, the button depressing when pushed to release a clamping force on the pole.

6. The adjustable stand of claim **1** further comprising:
a base rotating mechanism configured to allow rotation of the pole with respect to the base.

7. The adjustable stand of claim **1** further comprising:
a transmission line providing power to the electronic device;
a channel in the arm guiding the transmission line; and
a connection of the transmission line to the electronic device configured to rotate to keep the transmission line fixed with respect to the arm while allowing the electronic device to rotate with respect to the arm.

8. The adjustable stand of claim **1**, further comprising:
a clutch plate mounted between the arm plate and the pole, the clutch plate facilitating rotation of the arm with respect to the pole.

9. The adjustable stand of claim **8** further comprising:
a positioning member extending from the arm plate; and
detents on the clutch plate positioned to engage the positioning member, the detents being at least at positions 90 degrees apart on the clutch plate.

10. An adjustable stand, comprising:
a base:
a pole extending from the base;
an arm extending from the pole, the arm being extendable and rotatable;
a camera attached to the arm, the camera being rotatable with respect to the arm;
a pole slot in the pole;
an arm slot in the arm;
a clamp extending through the arm slot and the pole slot, allowing movement of the arm and fixing a position but allowing movement of the arm with respect to the pole when the clamp is released;
a button attached to the clamp, the button depressing when pushed to release a clamping force on the pole;
wherein movement of the camera by a user causes the arm to follow and move and rotate with respect to the camera;
at least three rollers mounted in the arm slot, allowing movement of the arm across the rollers;
an arm plate supporting the rollers on axles allowing rotation of the rollers; and
a support member connected to and supporting the plate, the support member being coupled to the pole.

11. The adjustable stand of claim 10 further comprising
a base rotating mechanism allowing rotation of the pole with respect to the base.

12. The adjustable stand of claim 10 further comprising:
a transmission line providing power to the camera;
a channel in the arm guiding the transmission line; and
a connection of the transmission line to the camera which rotates to keep the transmission line fixed with respect to the arm while allowing the camera to rotate with respect to the arm.

13. The adjustable stand of claim 10 further comprising:
a clutch plate mounted between the arm plate and the pole, the clutch plate facilitating rotation of the arm with respect to the pole.

14. The adjustable stand of claim 13 further comprising:
a positioning member extending from the plate; and
detents on the clutch plate positioned to engage the positioning member, the detents being at least at positions 90 degrees apart on the clutch plate.

15. The adjustable stand of claim 14 further comprising:
a compressible element connected to the button;
a support member connecting the button to the arm plate;
a block connected to the member, the block having serrated ridges;
a serrated surface on an inside of the pole slot configured to engage the serrated ridges of the block; and
whereby when the button is pushed, the serrated ridges are separated from the serrated surface, thus disengaging and allowing movement of the arm plate and the arm.

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