US 20100243850A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2010/0243850 A1

(43) Pub. Date: Sep. 30, 2010

Derry

(54) **FOLDING SUPPORT STAND FOR PORTABLE ELECTRONIC DEVICES**

(75) Inventor: **Bradley A. Derry**, Emmaus, PA (US)

Correspondence Address:
DESIGN IP, P.C.
5100 W. TILGHMAN STREET, SUITE 205
ALLENTOWN, PA 18104 (US)

(73) Assignee: **INNOVATIVE OFFICE PRODUCTS, INC.**, Easton, PA (US)

(21) Appl. No.: **12/732,956**

(22) Filed: **Mar. 26, 2010**

Related U.S. Application Data

(63) Continuation of application No. 11/789,692, filed on Apr. 25, 2007, now Pat. No. 7,712,719.

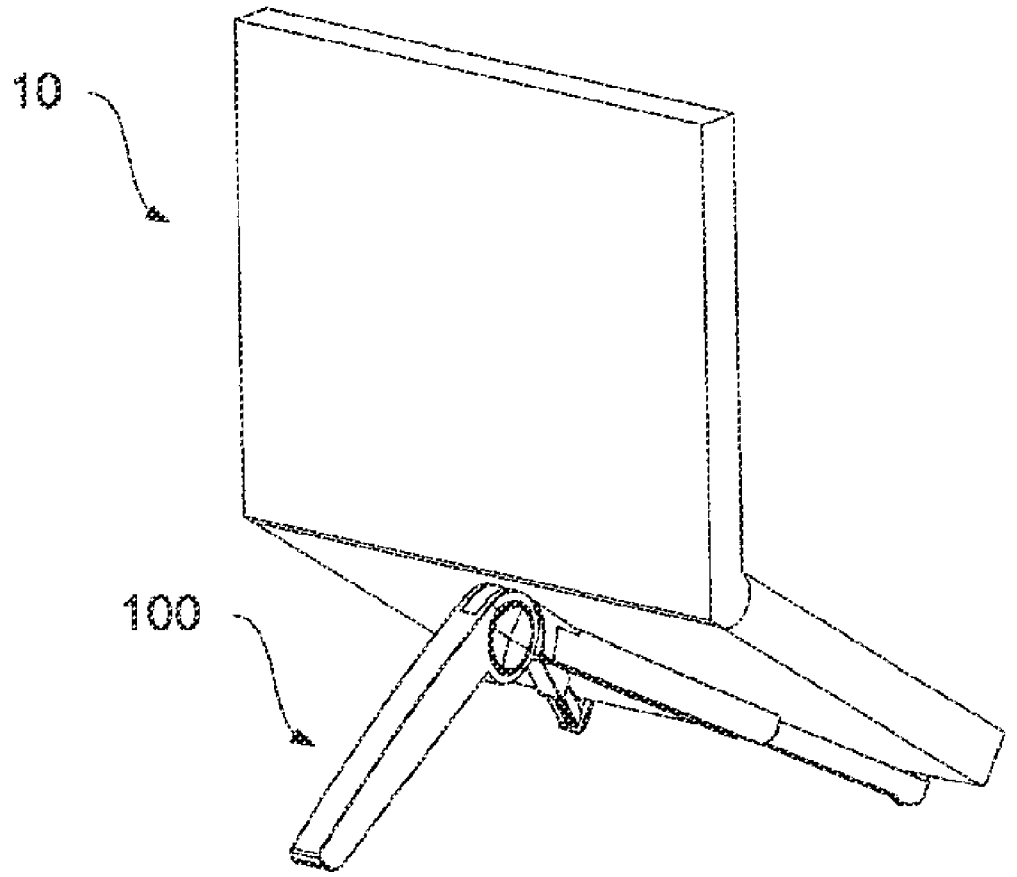
Publication Classification

(51) **Int. Cl.**
F16M 11/38 (2006.01)
G08B 21/18 (2006.01)

(52) **U.S. Cl.** **248/372.1**; 248/398; 340/540

(57) **ABSTRACT**

The present invention provides a portable support stand for various devices such as laptop computers, tablet PCs and other electronic equipment. The stand has a tripod configuration which promotes stability of the user device. The front legs of the tripod may be adjusted between compact and extended positions, and may be placed in a position relative to the rear leg anywhere from 0° in a fully closed position to approximately 180° in a fully open position. Audible indicators are used with overall stand adjustment and with adjustment of stoppers at the ends of the front legs. Adjustment of the front legs relative to the rear leg employs a pivot section, including a finger disc spring, an adjustment actuator and an engagement member between the spring and the actuator. The engagement member includes projections or dimples which engage receptacles on an engagement member to secure the stand in a desired arrangement.



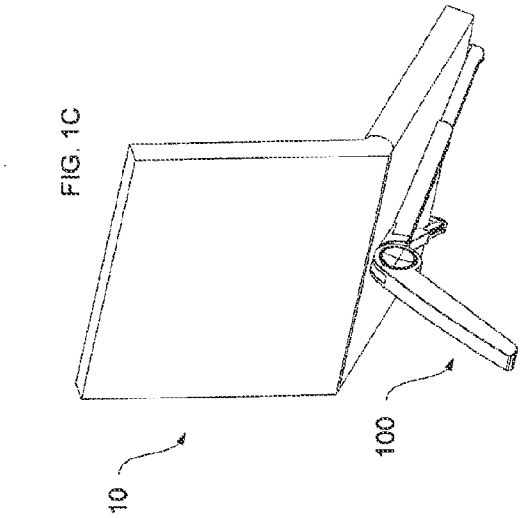


FIG. 1C

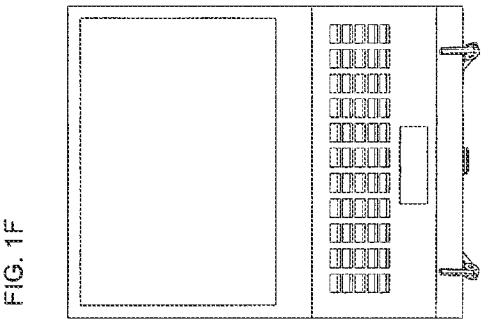


FIG. 1F

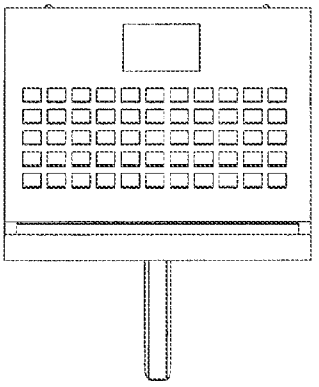


FIG. 1B

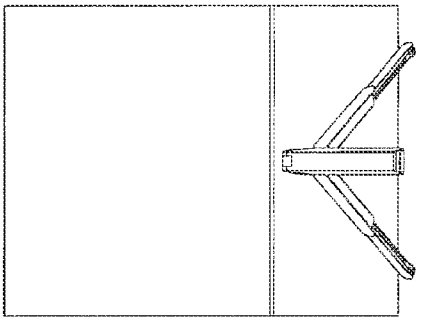


FIG. 1D

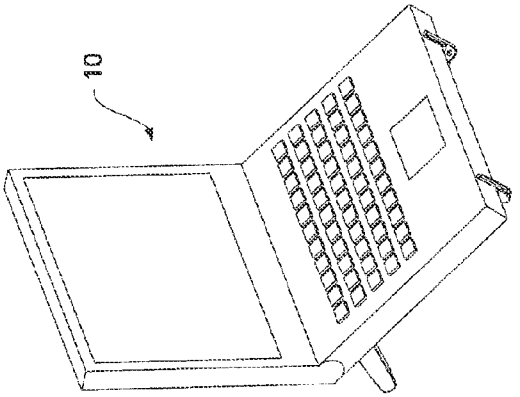
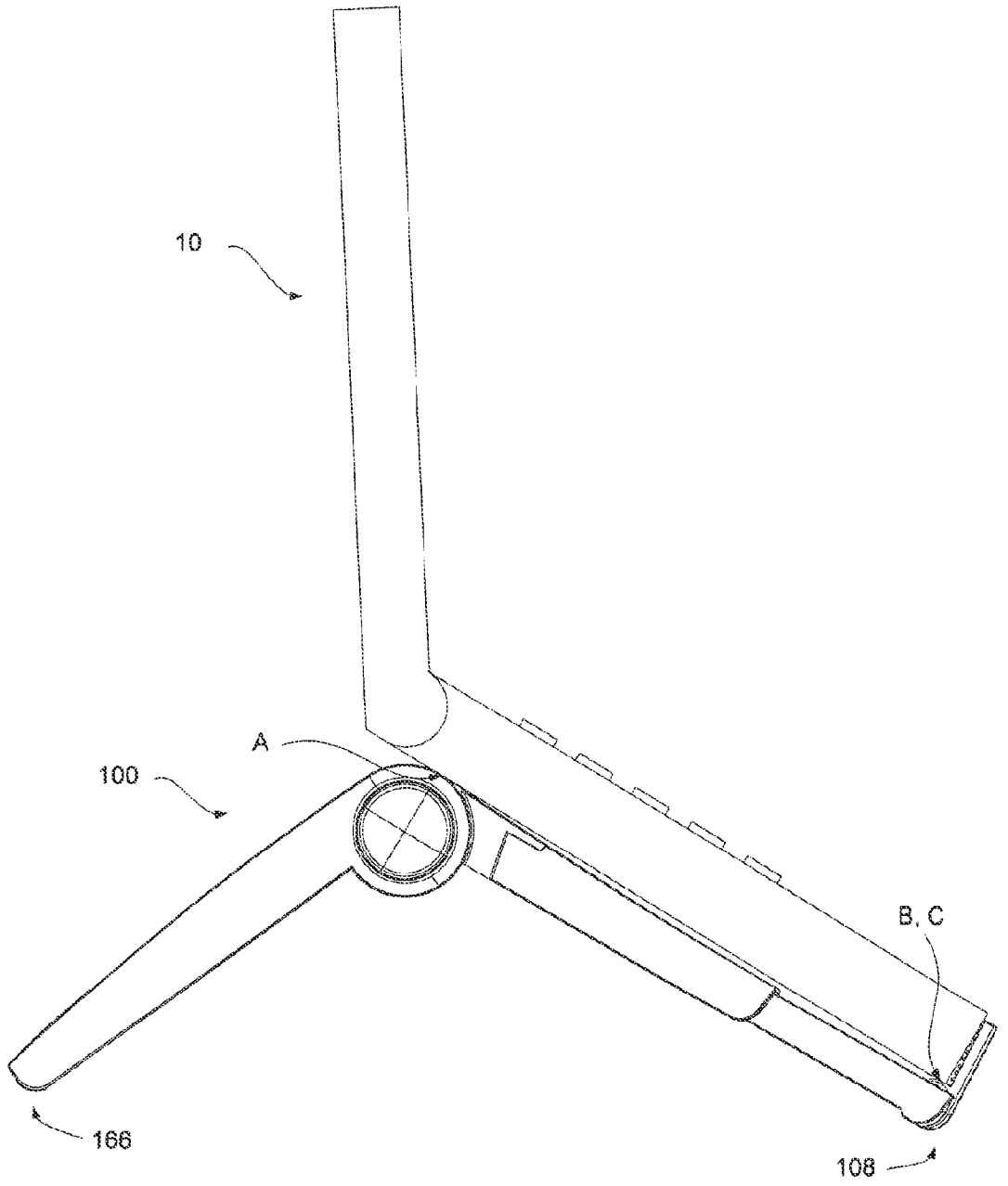


FIG. 1A

FIG. 1E



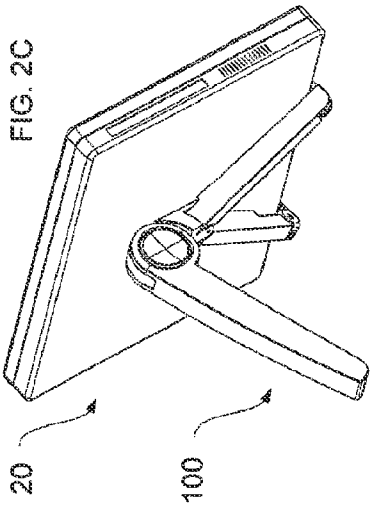


FIG. 2C

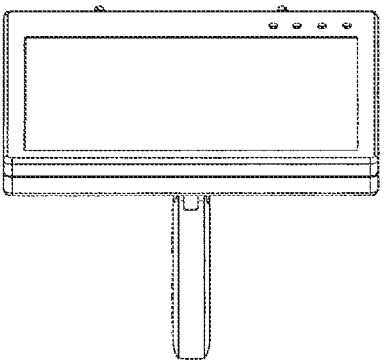


FIG. 2B

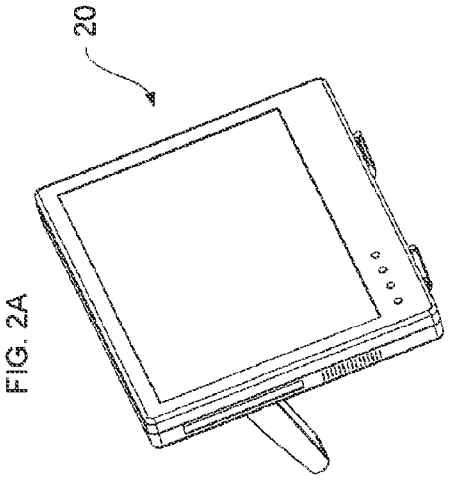


FIG. 2A

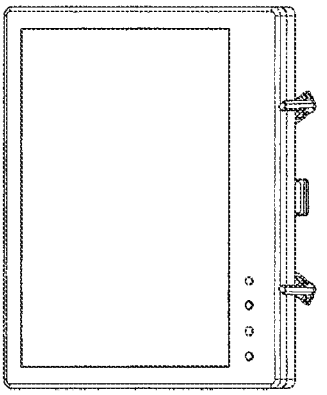


FIG. 2F

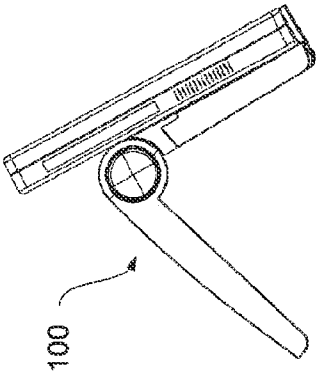


FIG. 2E

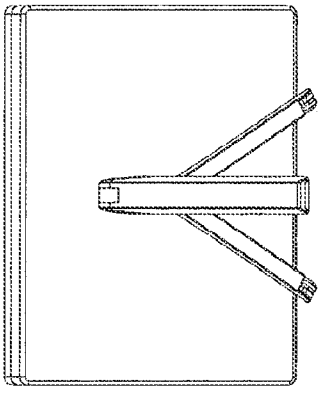


FIG. 2D

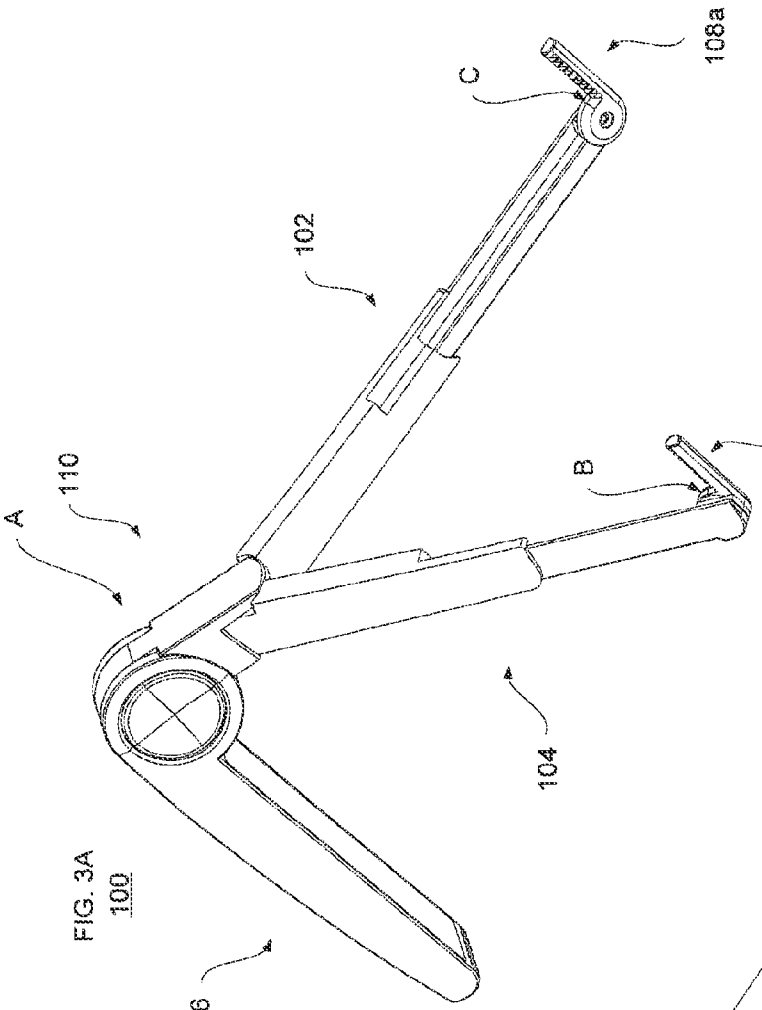


FIG. 3A
100

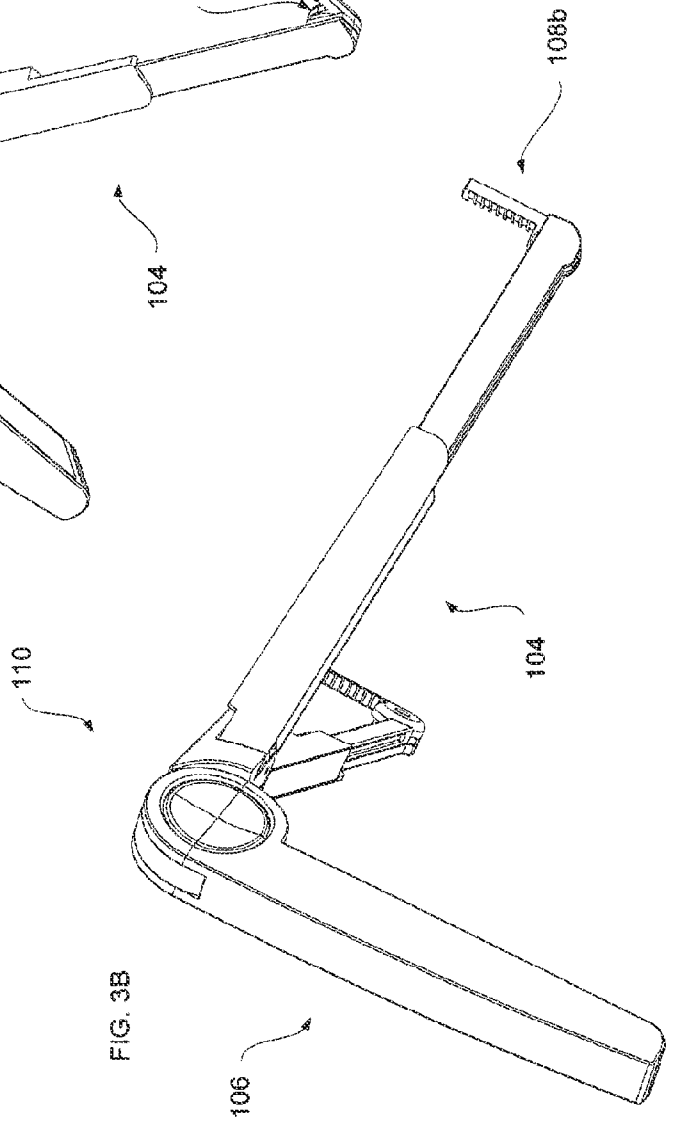


FIG. 3B

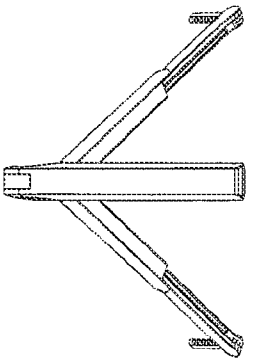


FIG. 3C

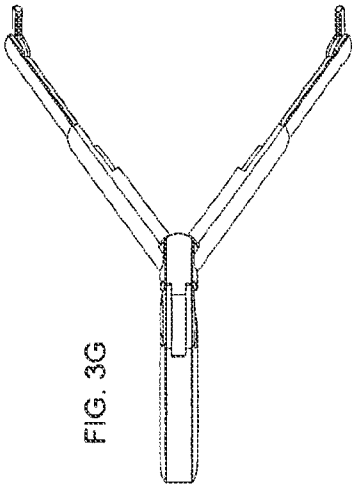


FIG. 3G

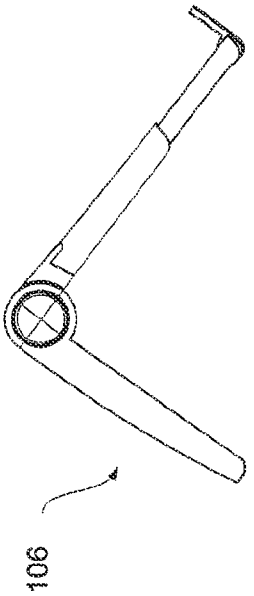


FIG. 3E

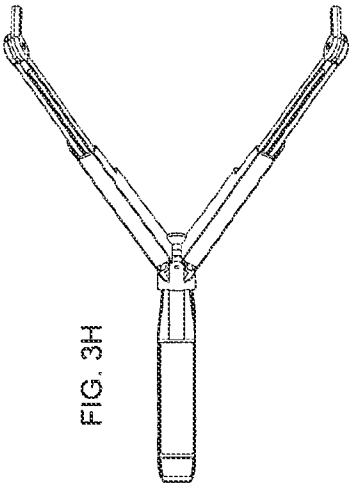


FIG. 3H

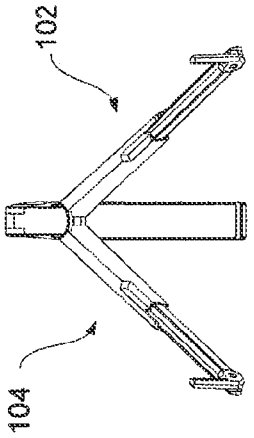


FIG. 3D

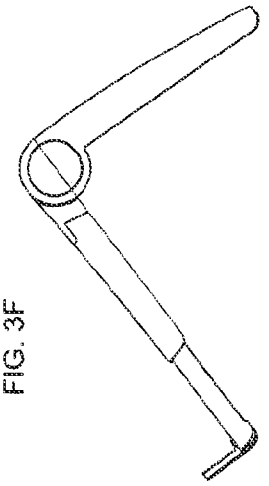
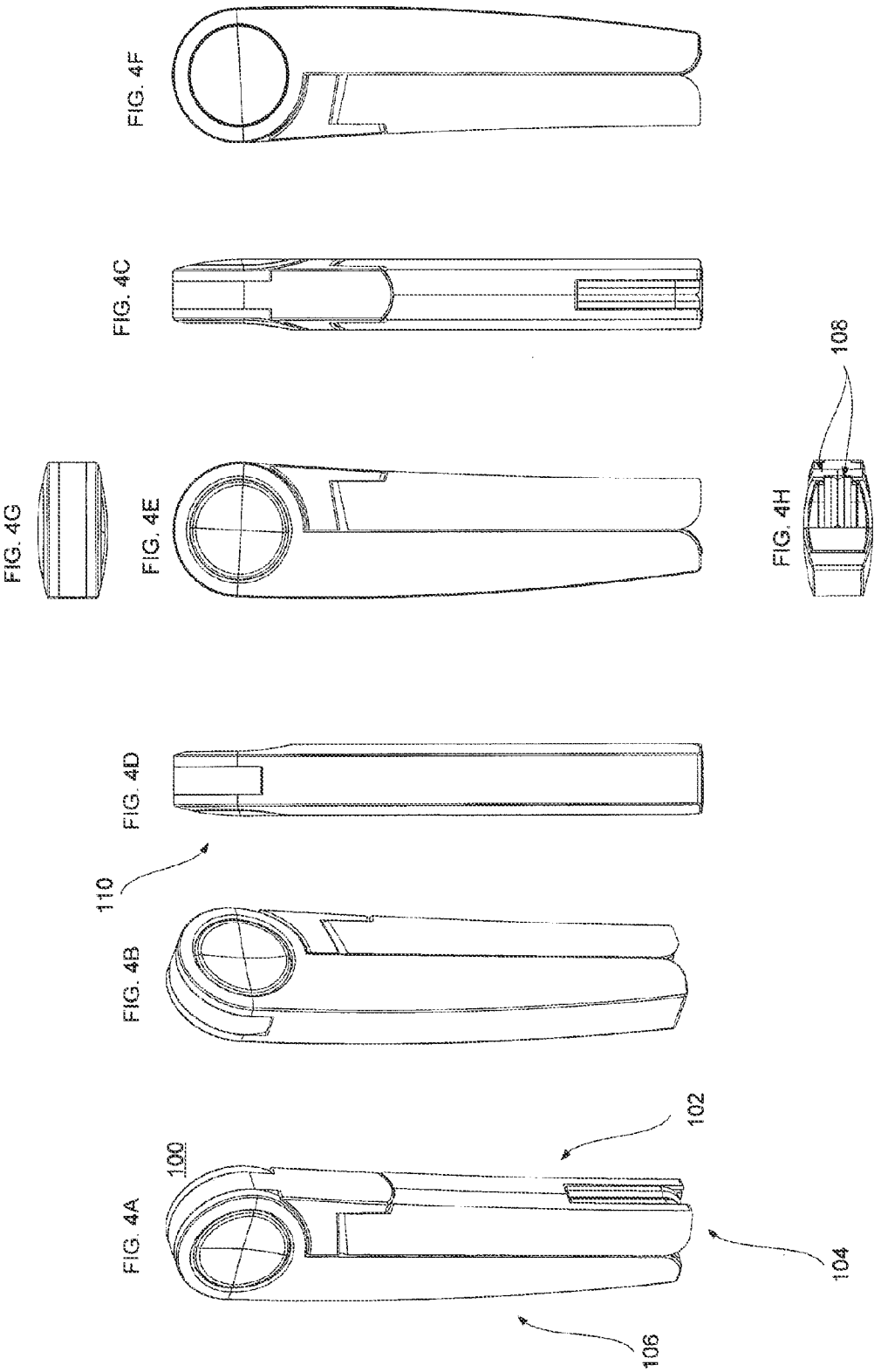


FIG. 3F


FIG. 4F
FIG. 4C
FIG. 4G
FIG. 4E
108
FIG. 4H
FIG. 4D
110
FIG. 4B
FIG. 4A
100
102
104
106

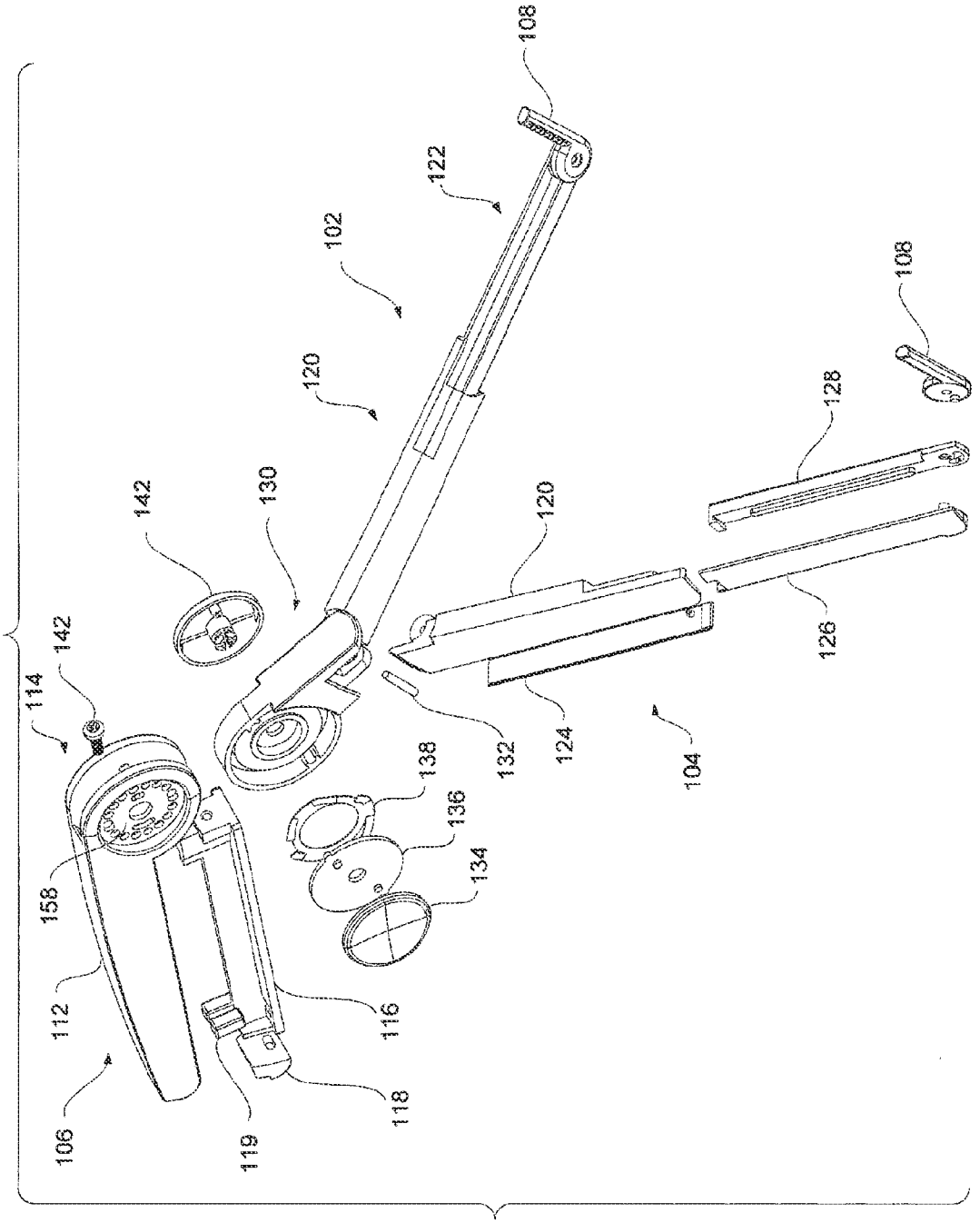
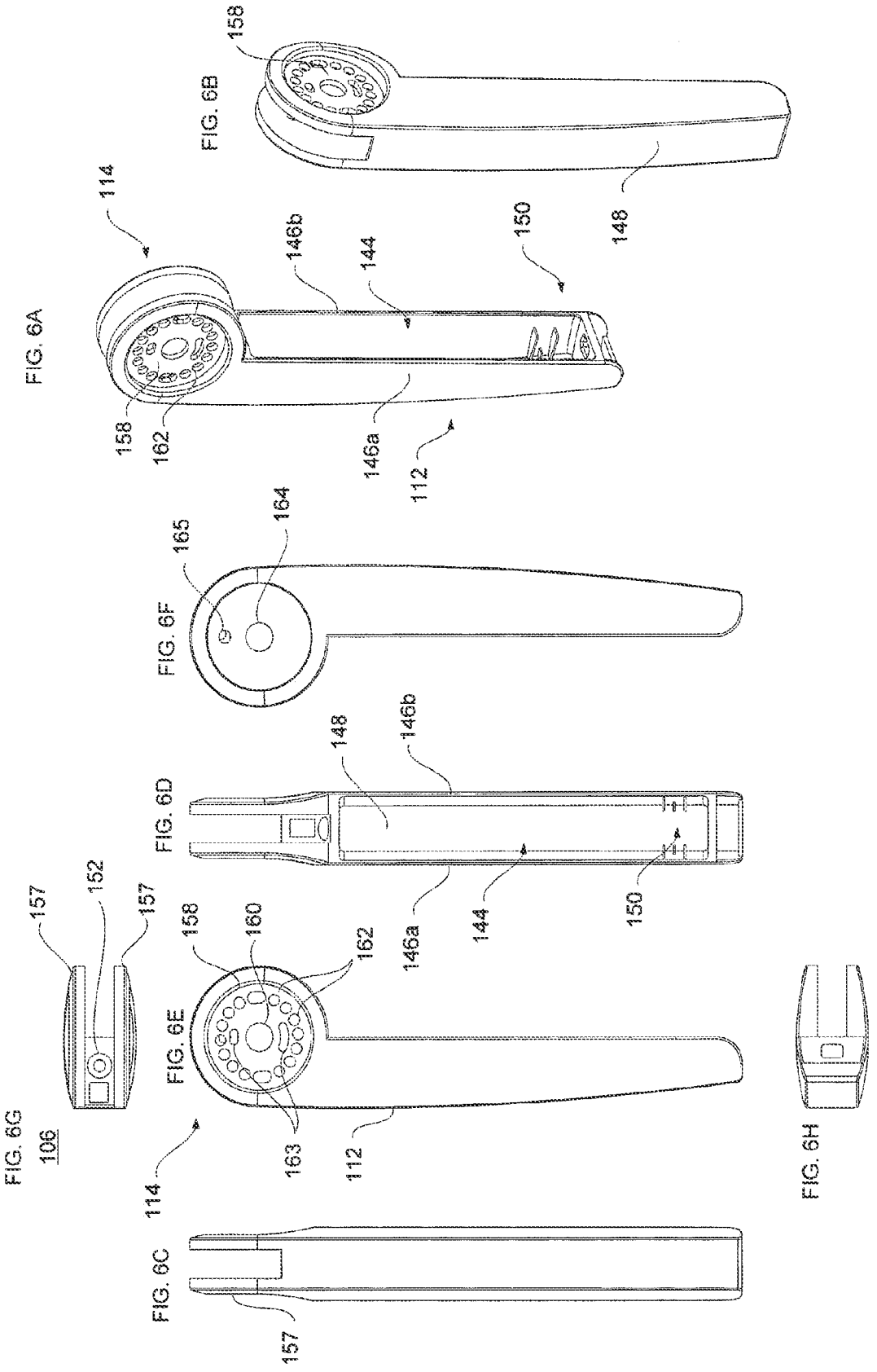
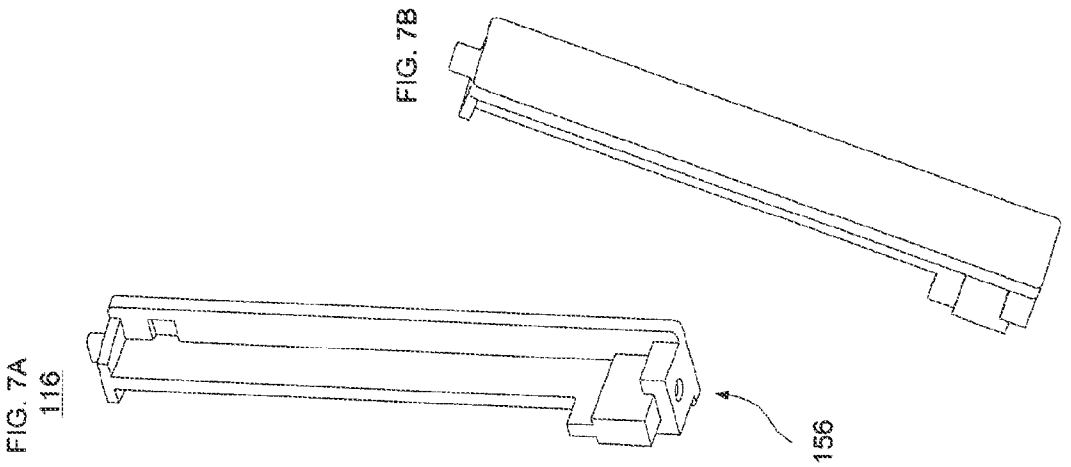
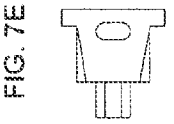
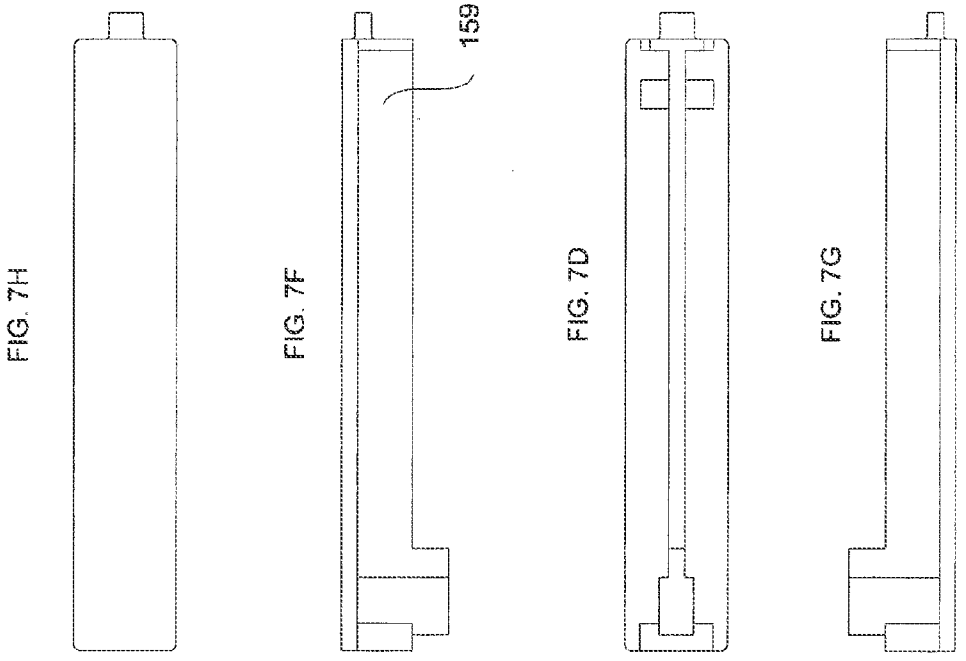

108
122
102
120
108
128
142
130
120
142
114
126
132
124
104
138
136
134
158
112
116
106
119
118

FIG. 5
100


FIG. 6A
114
158
162
146a
112
146b
144
150
148
FIG. 6B
158
FIG. 6C
157
FIG. 6D
148
146b
146a
144
150
FIG. 6E
158
160
162
163
112
114
FIG. 6F
165
164
FIG. 6G
106
157
152
157
FIG. 6H


FIG. 7B
FIG. 7A
116
156


FIG. 7E


FIG. 7H
FIG. 7F
159
FIG. 7D
FIG. 7G

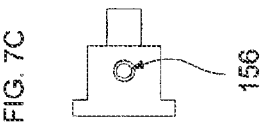

FIG. 7C
156

FIG. 8B

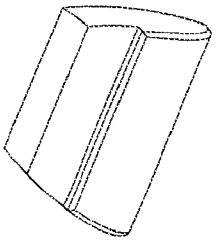


FIG. 8A
118

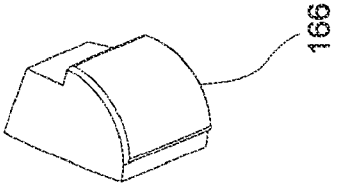


FIG. 8H

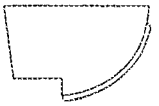


FIG. 8E

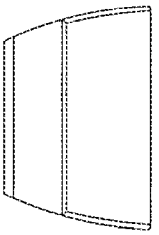


FIG. 8G

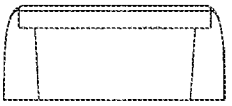


FIG. 8D

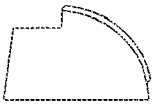


FIG. 8F

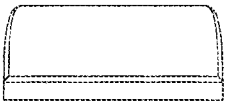
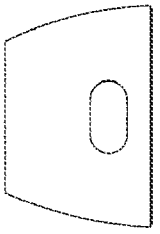


FIG. 8C



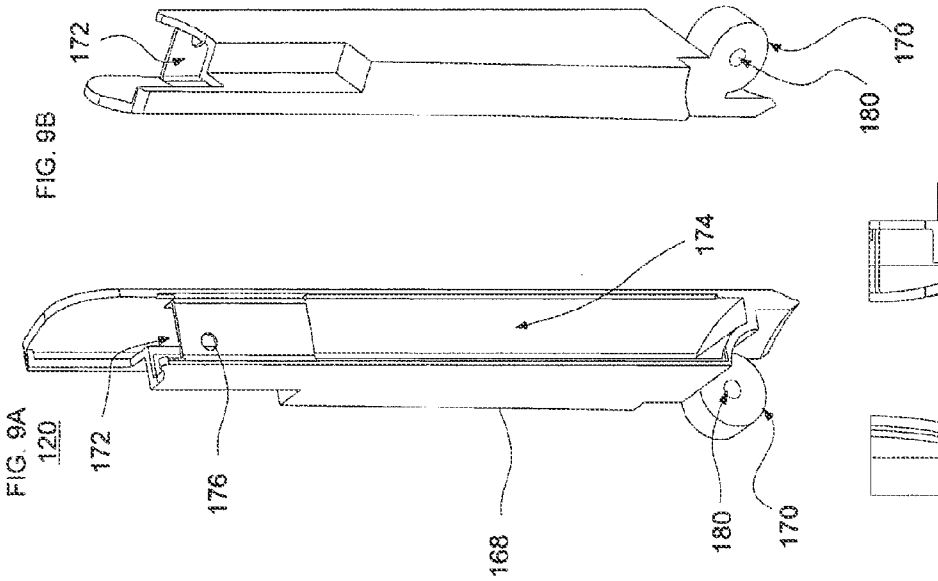


FIG. 9B

FIG. 9A 120

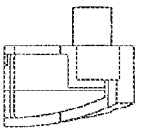


FIG. 9H

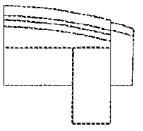


FIG. 9G

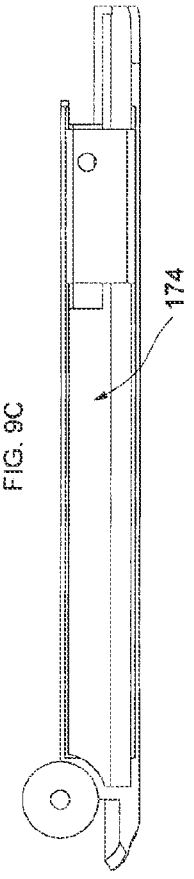


FIG. 9C

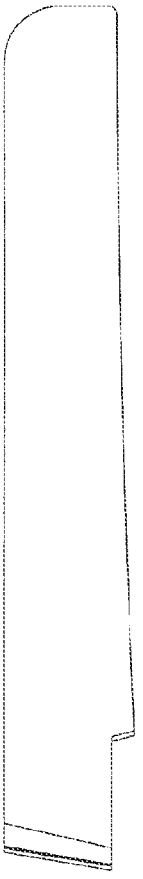


FIG. 9D

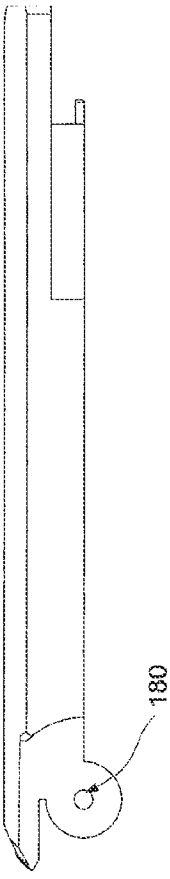


FIG. 9E

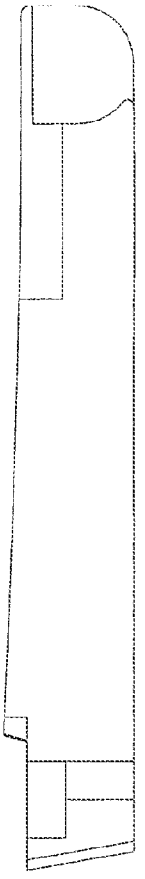


FIG. 9F

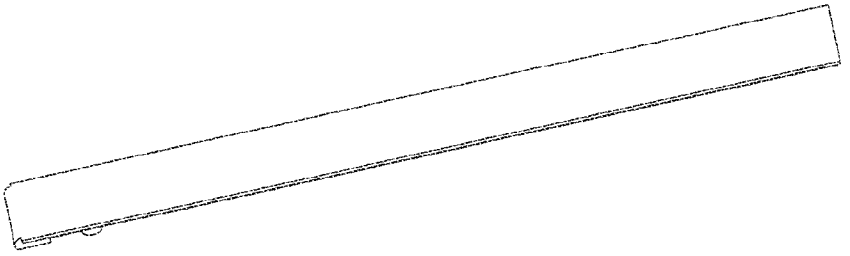


FIG. 10B



FIG. 10A
124

178

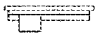


FIG. 10H

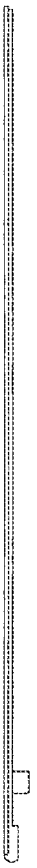


FIG. 10C

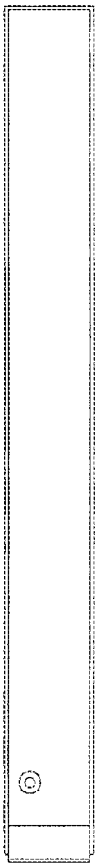


FIG. 10D



FIG. 10E



FIG. 10F

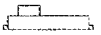


FIG. 10G

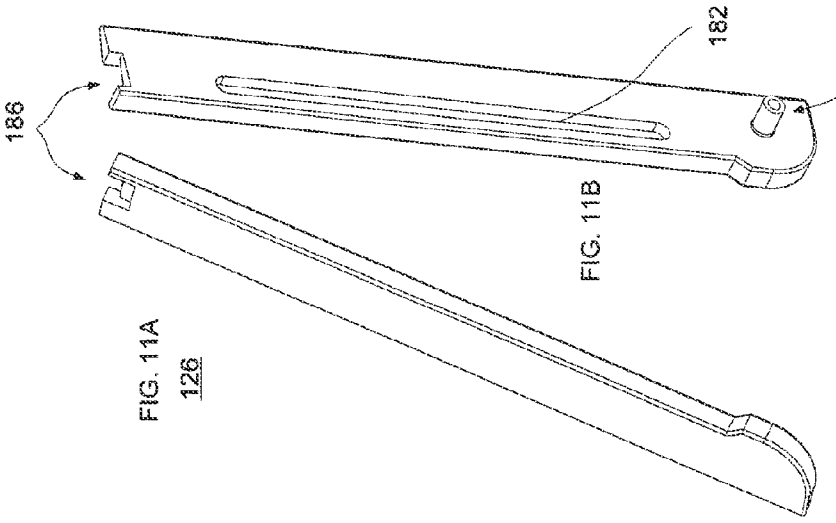


FIG. 11A

FIG. 11B

FIG. 11H

FIG. 11G

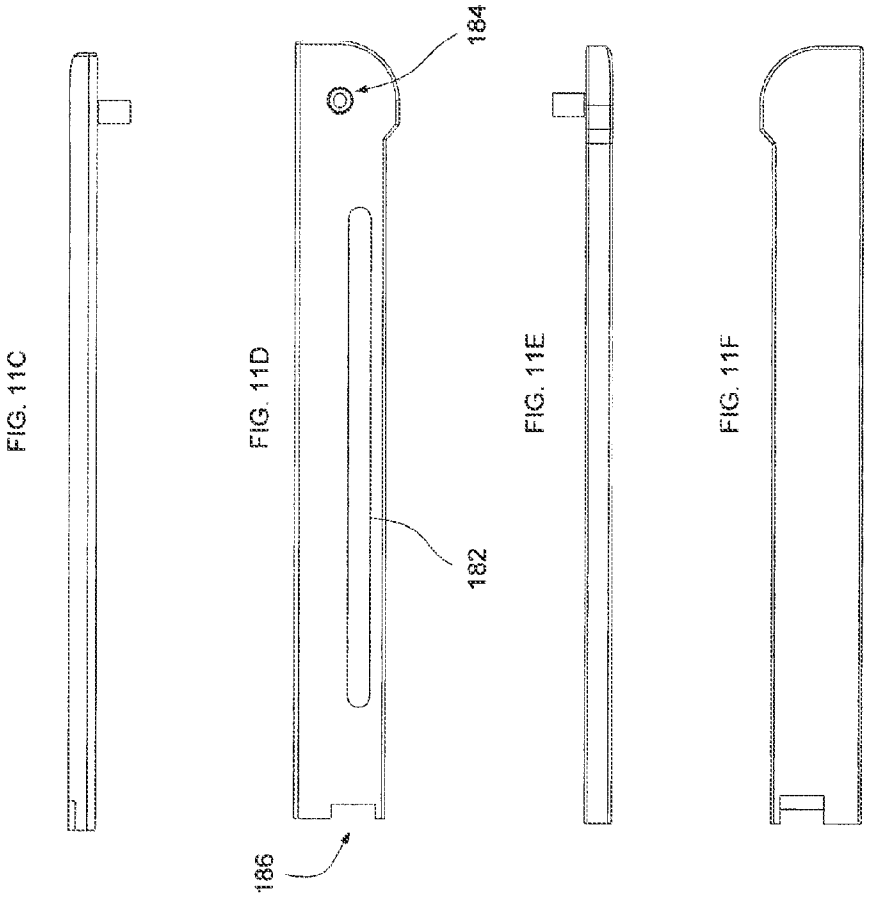


FIG. 11C

FIG. 11D

FIG. 11E

FIG. 11F

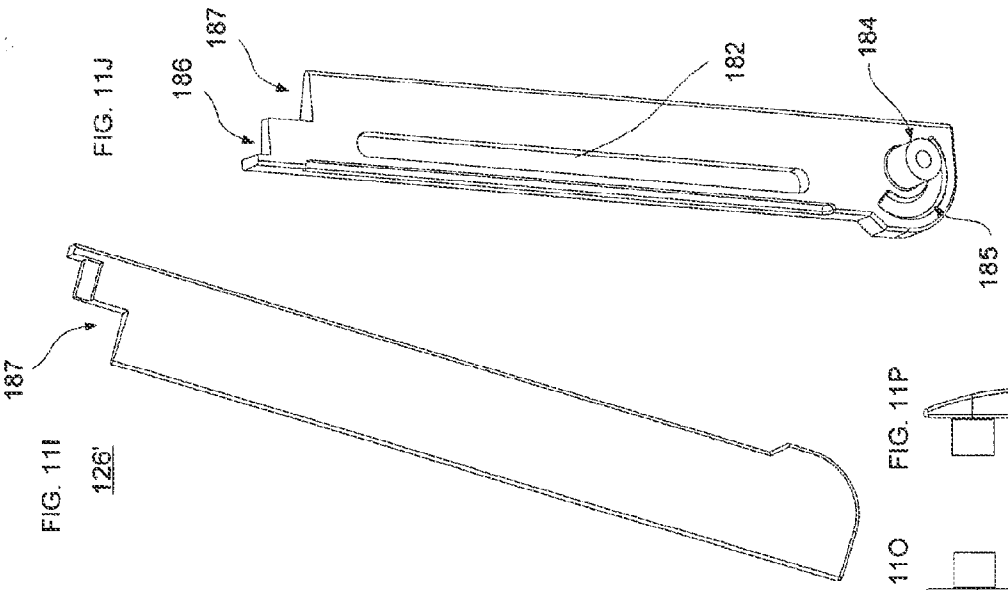


FIG. 11J

FIG. 11I

FIG. 11P

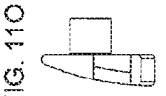


FIG. 11O



FIG. 11K

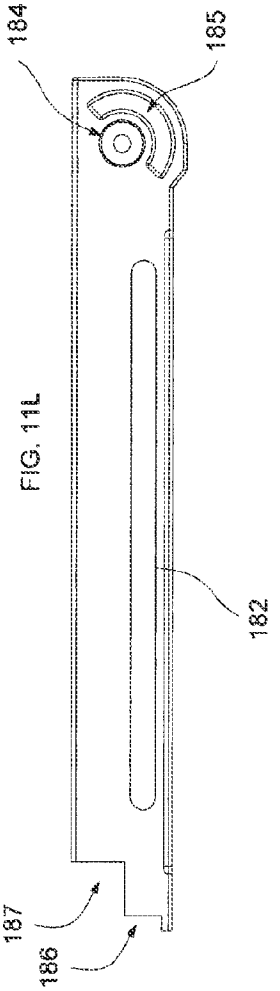


FIG. 11L

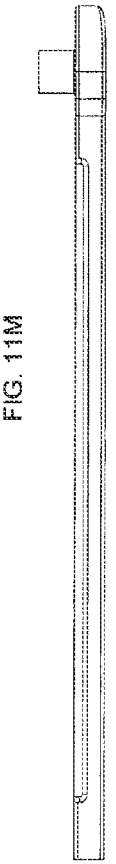


FIG. 11M

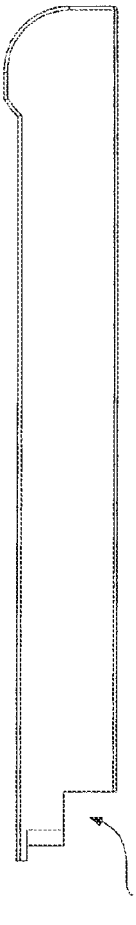
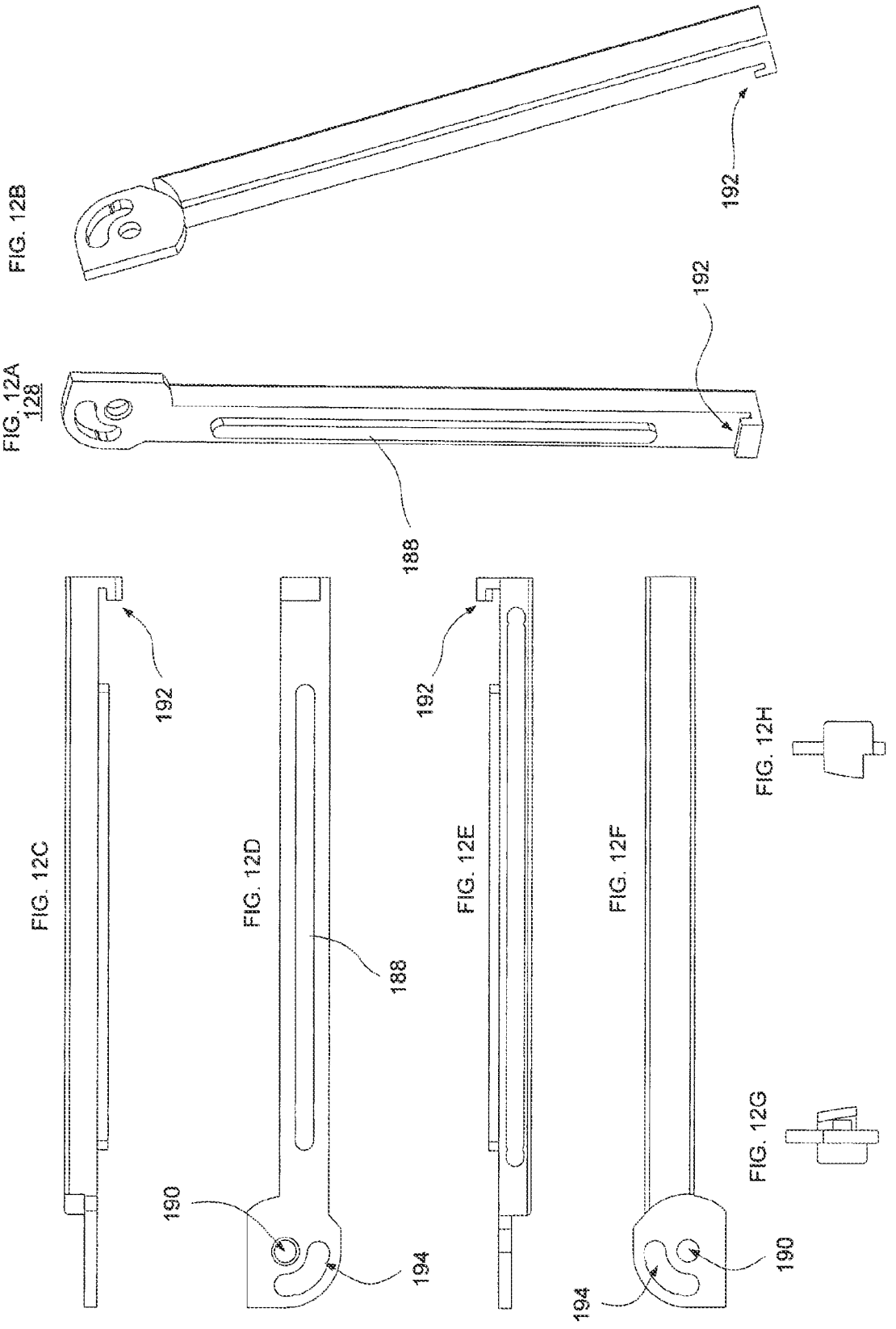


FIG. 11N


FIG. 12B
192
FIG. 12A
128
192
188
FIG. 12C
192
FIG. 12D
188
190
194
FIG. 12E
192
FIG. 12F
194
190
FIG. 12H
FIG. 12G

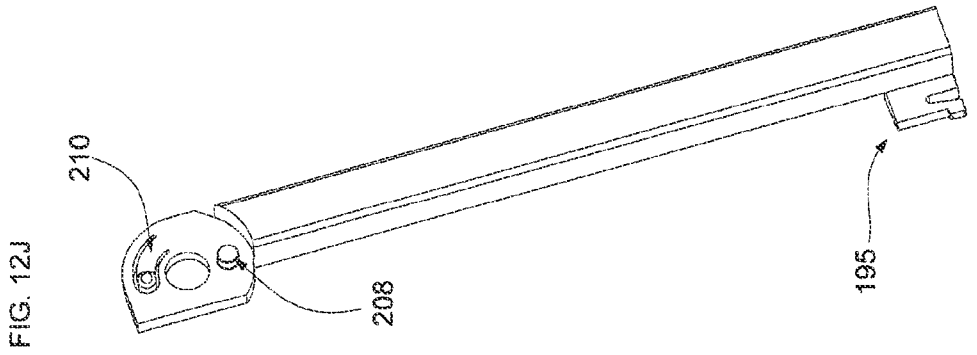


FIG. 12J

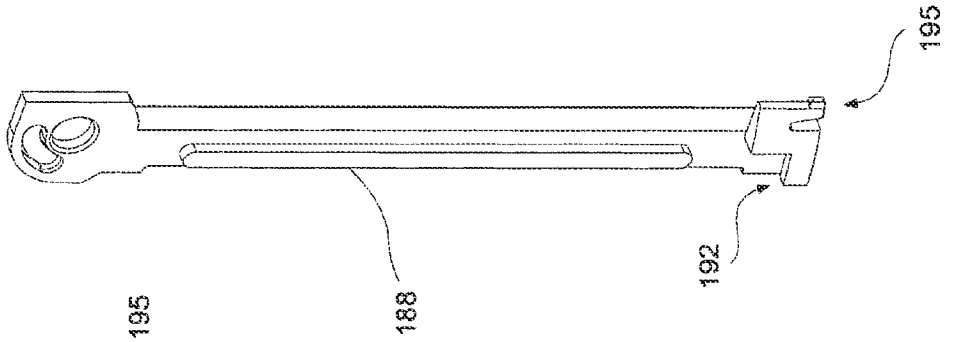


FIG. 12I
128'

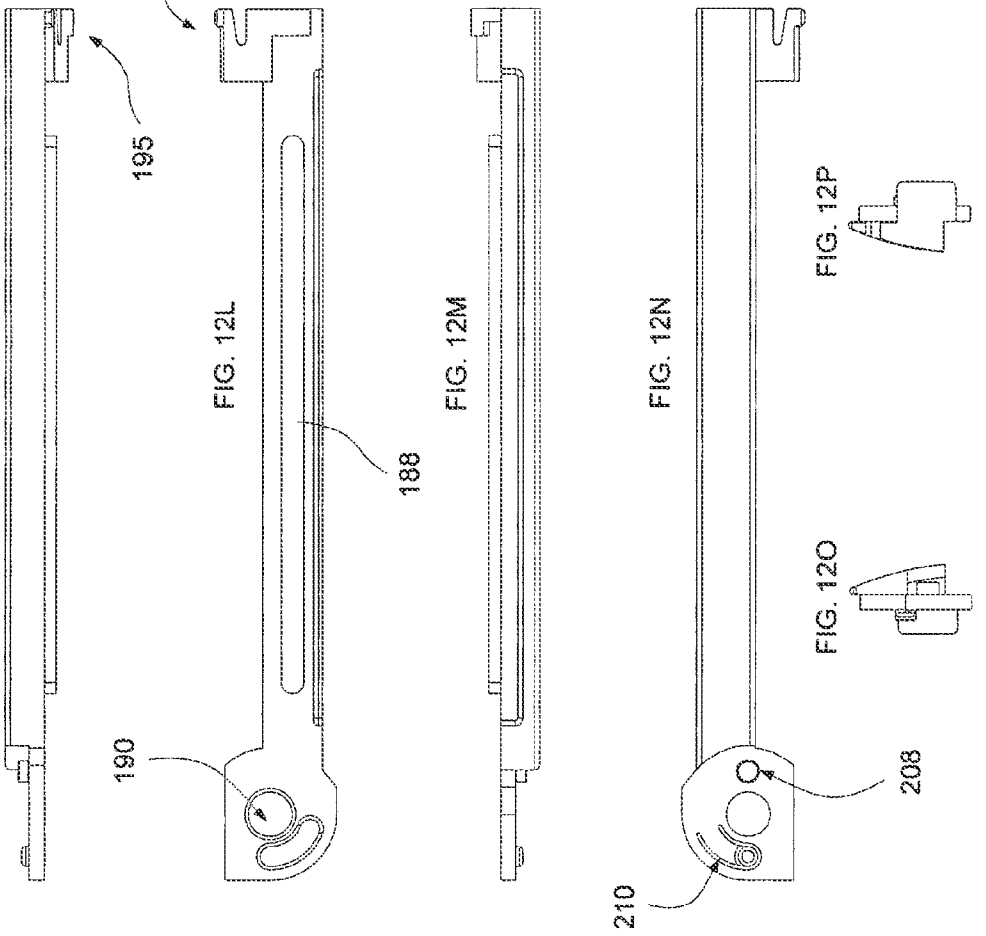


FIG. 12K

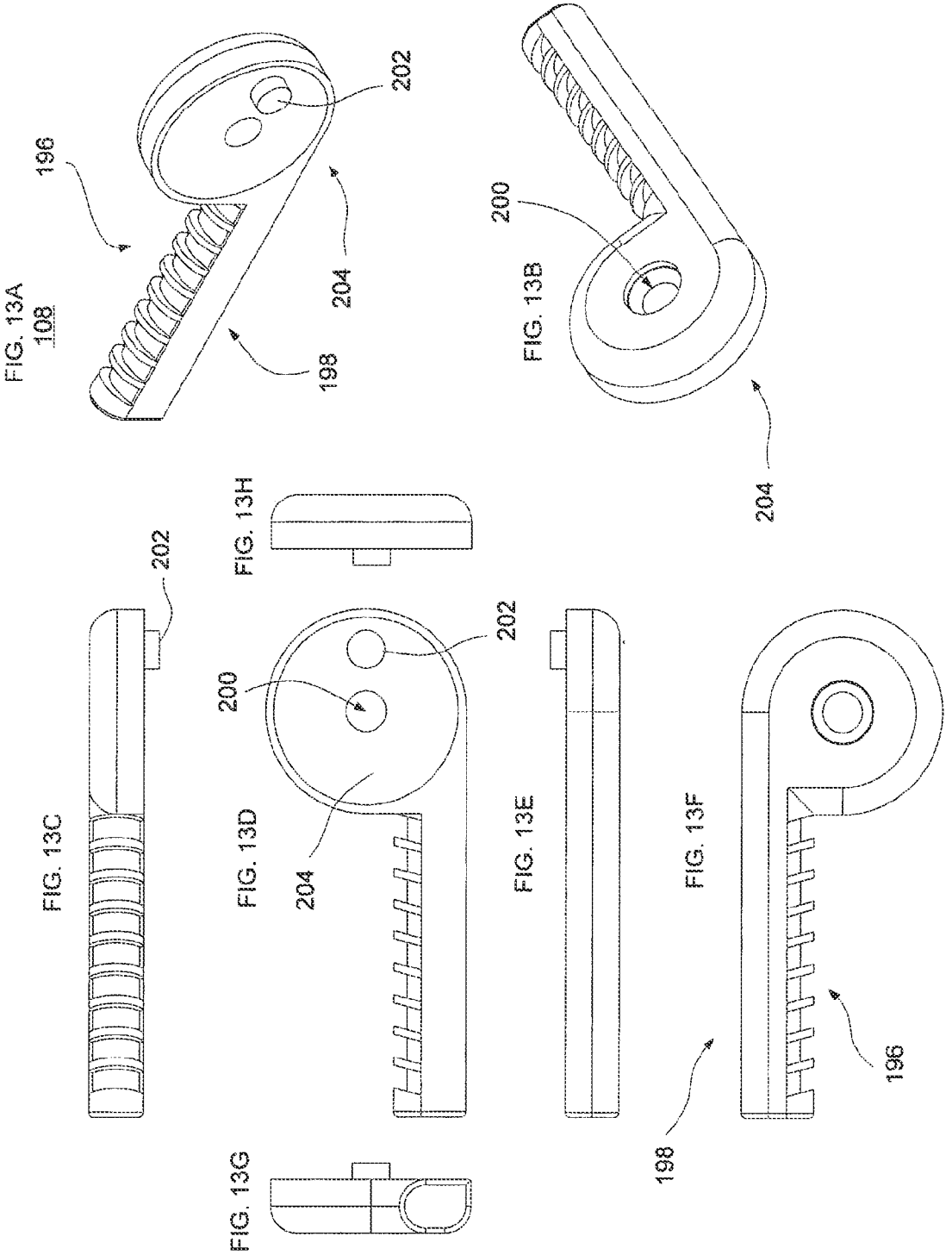
FIG. 12L

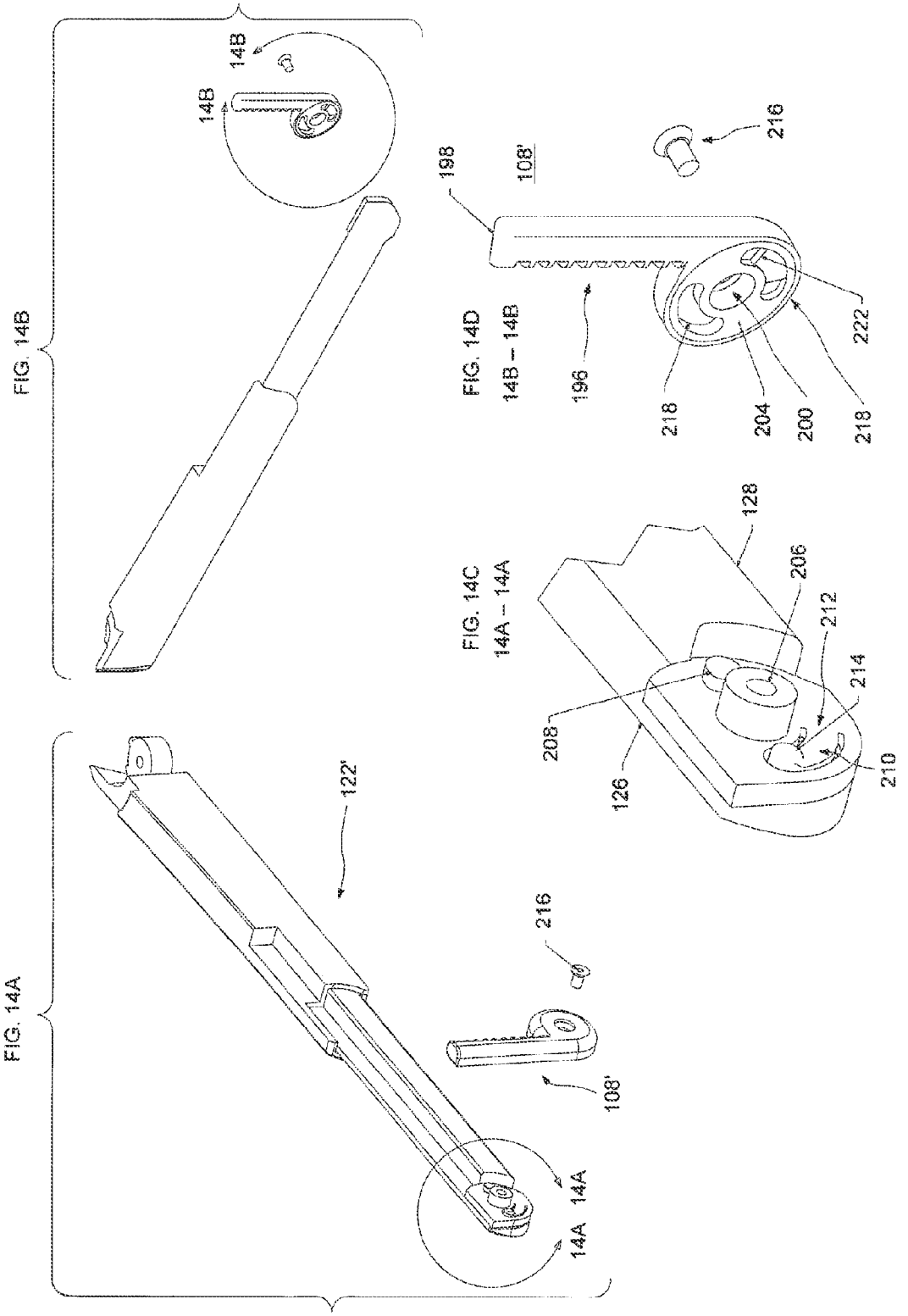
FIG. 12M

FIG. 12N

FIG. 12P

FIG. 12O


FIG. 13A
108
196
202
204
198
FIG. 13B
200
204
FIG. 13C
202
FIG. 13D
200
202
204
FIG. 13E
FIG. 13F
198
196
FIG. 13G
FIG. 13H


FIG. 14A
122'
216
108'
14A
14A
FIG. 14B
14B
14B
FIG. 14C
14A – 14A
128
206
212
214
208
126
210
FIG. 14D
14B – 14B
198
108'
216
196
218
204
200
218
222

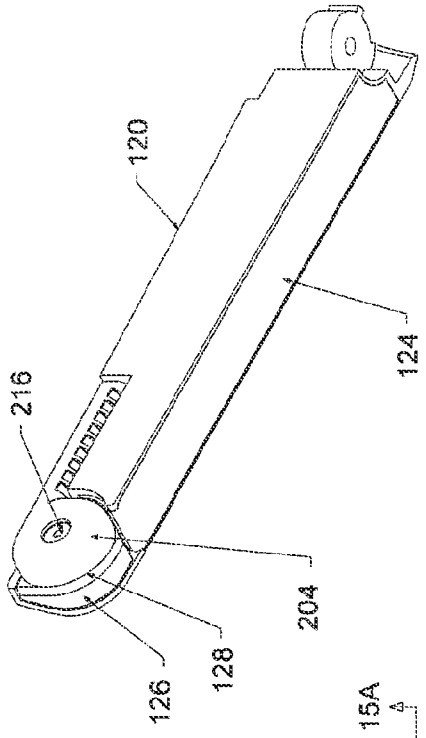


FIG. 15A

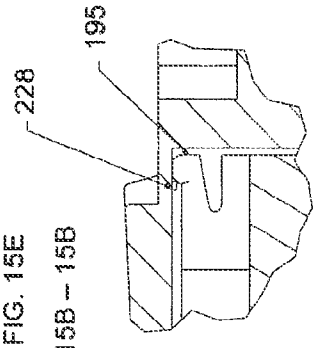


FIG. 15E
15B – 15B

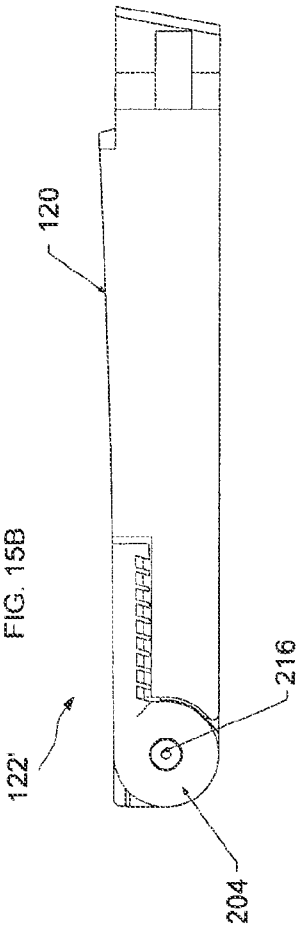


FIG. 15B

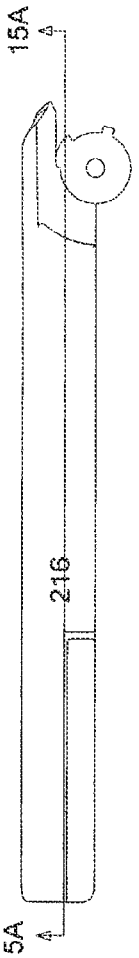


FIG. 15C

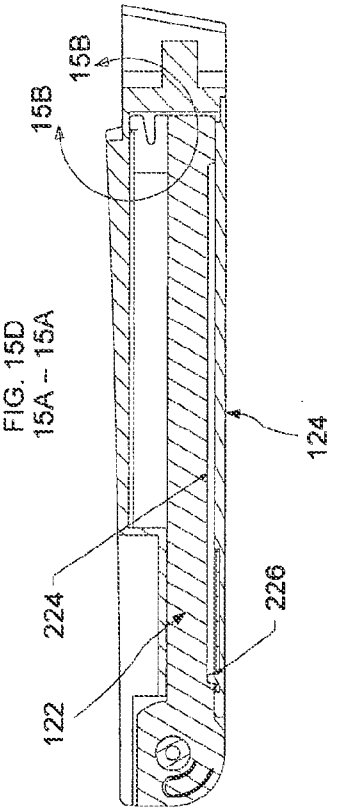
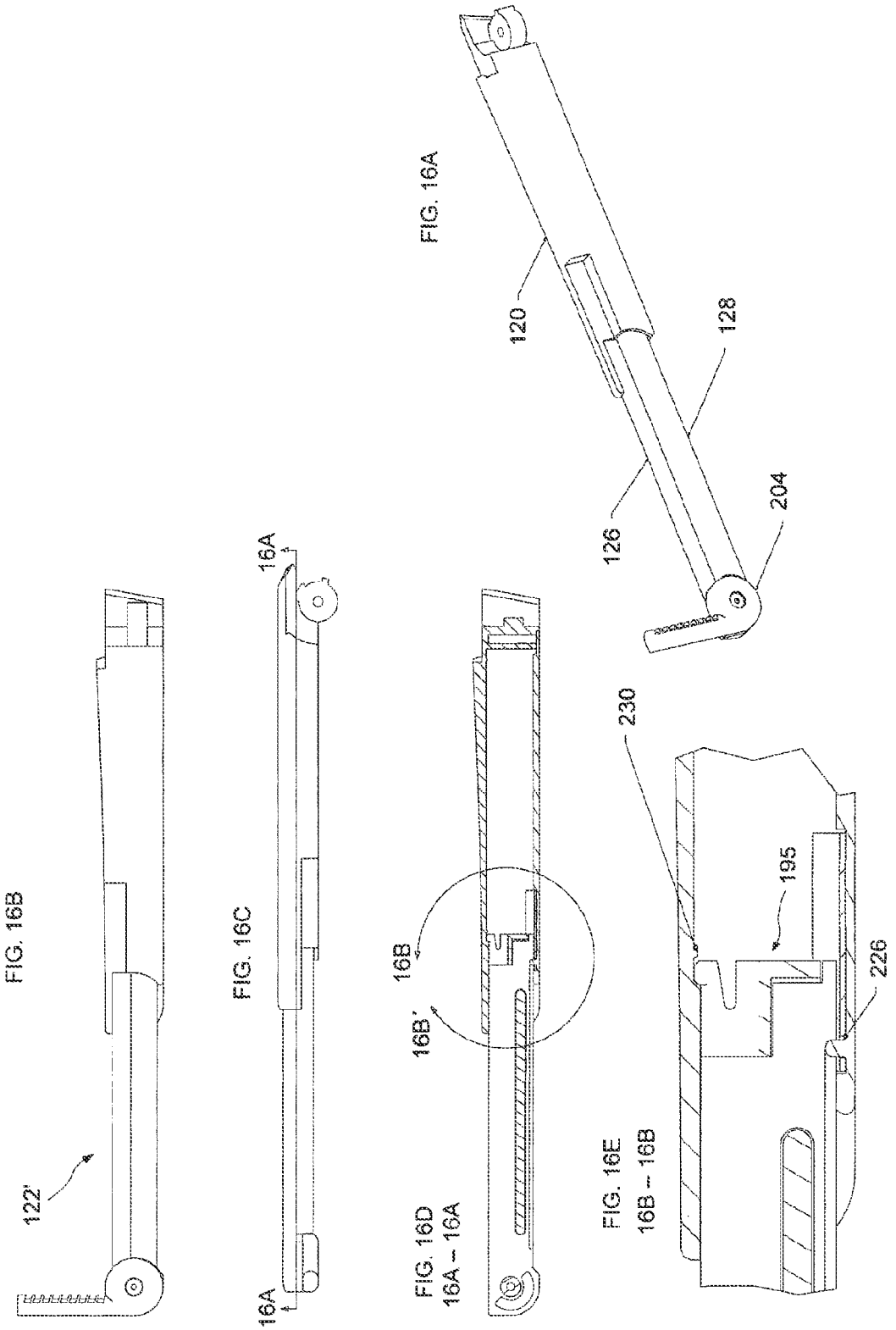
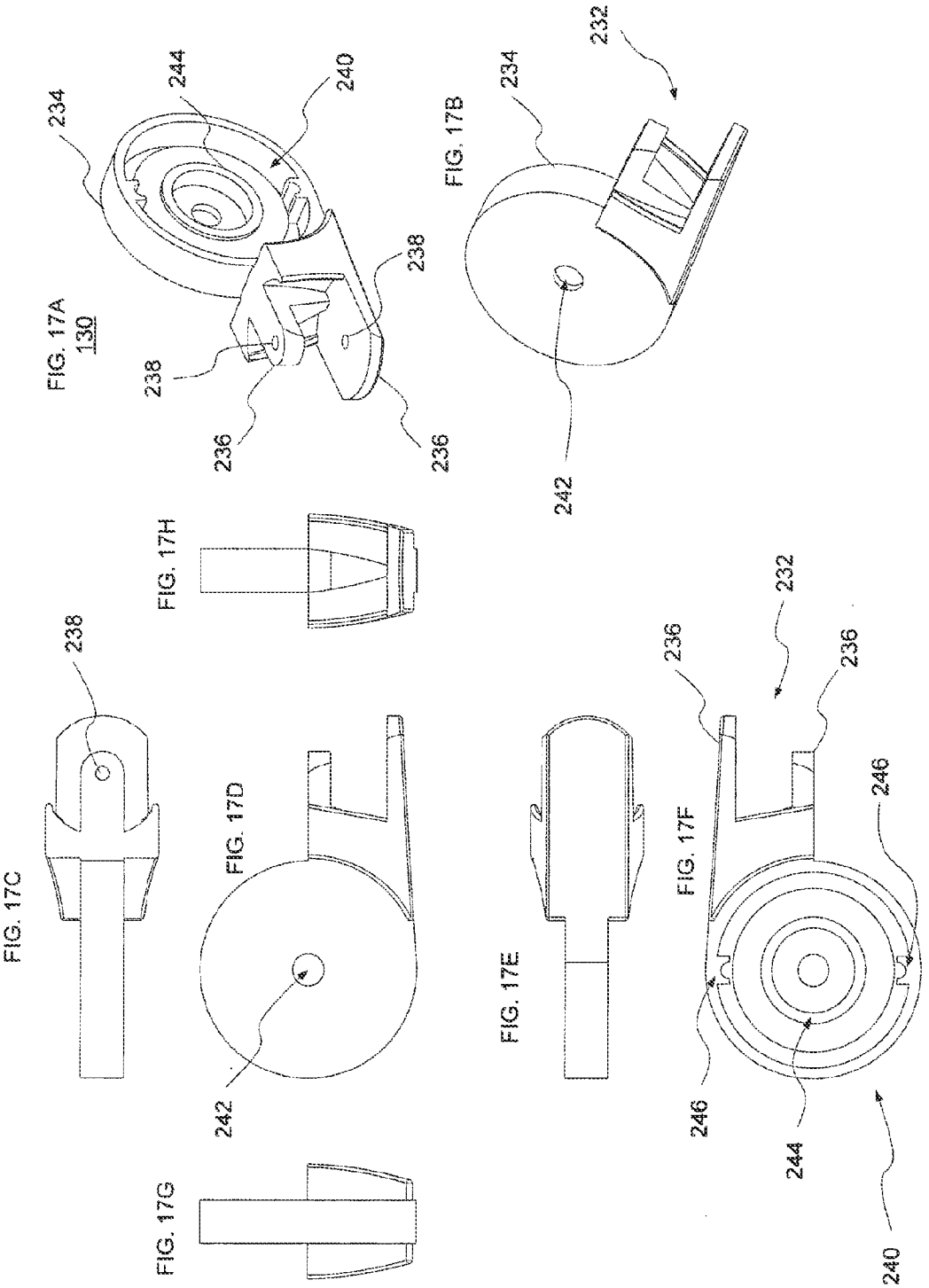
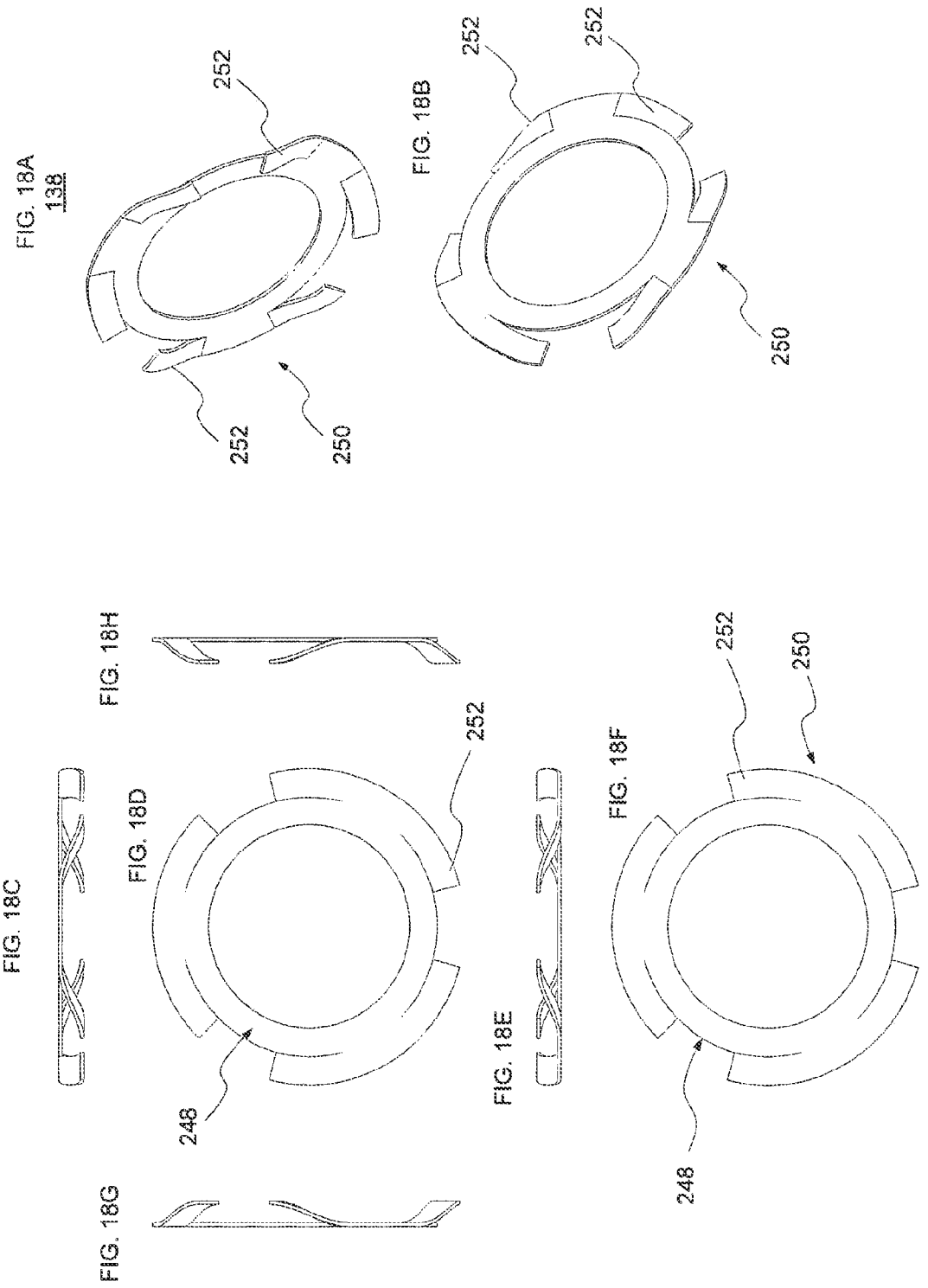
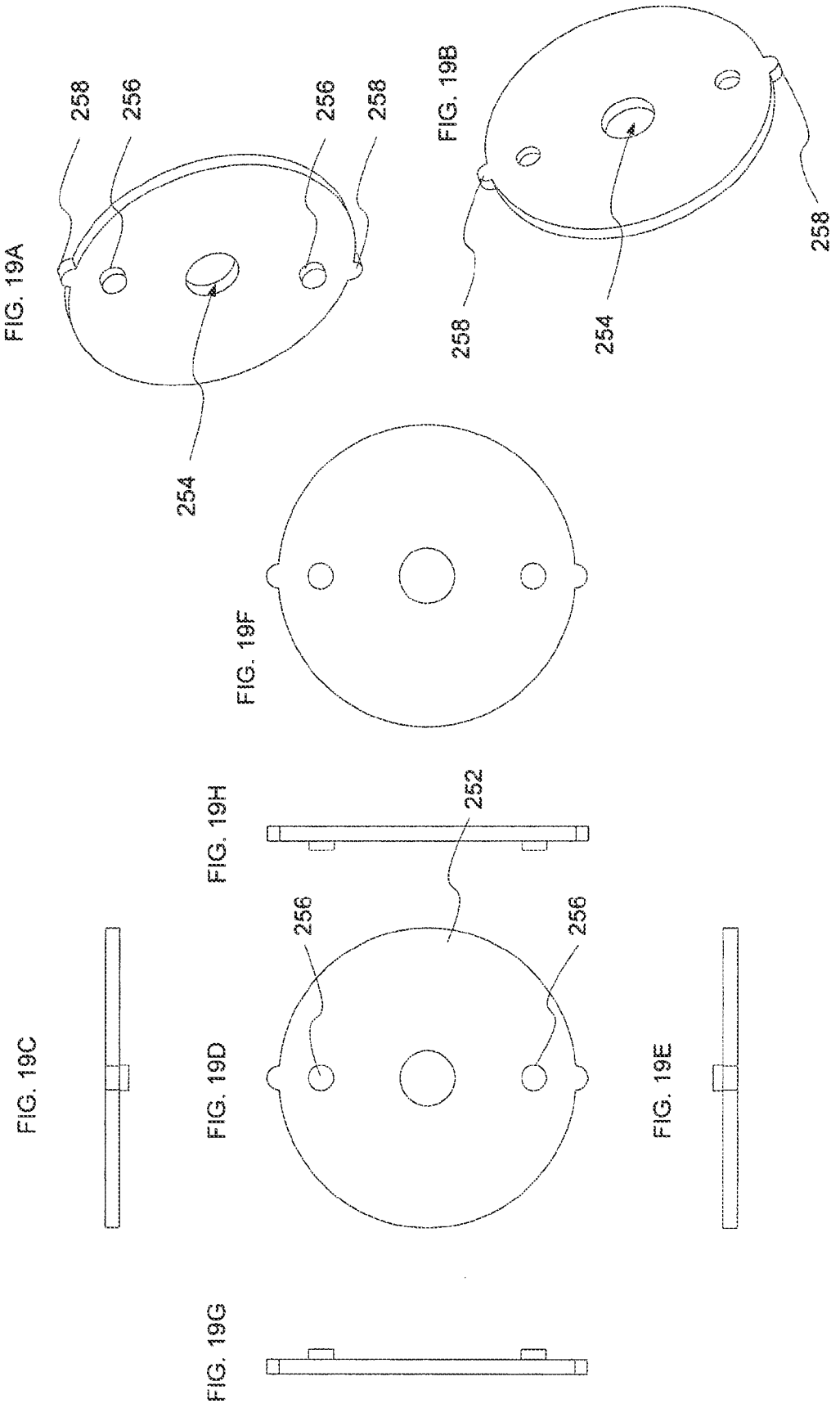


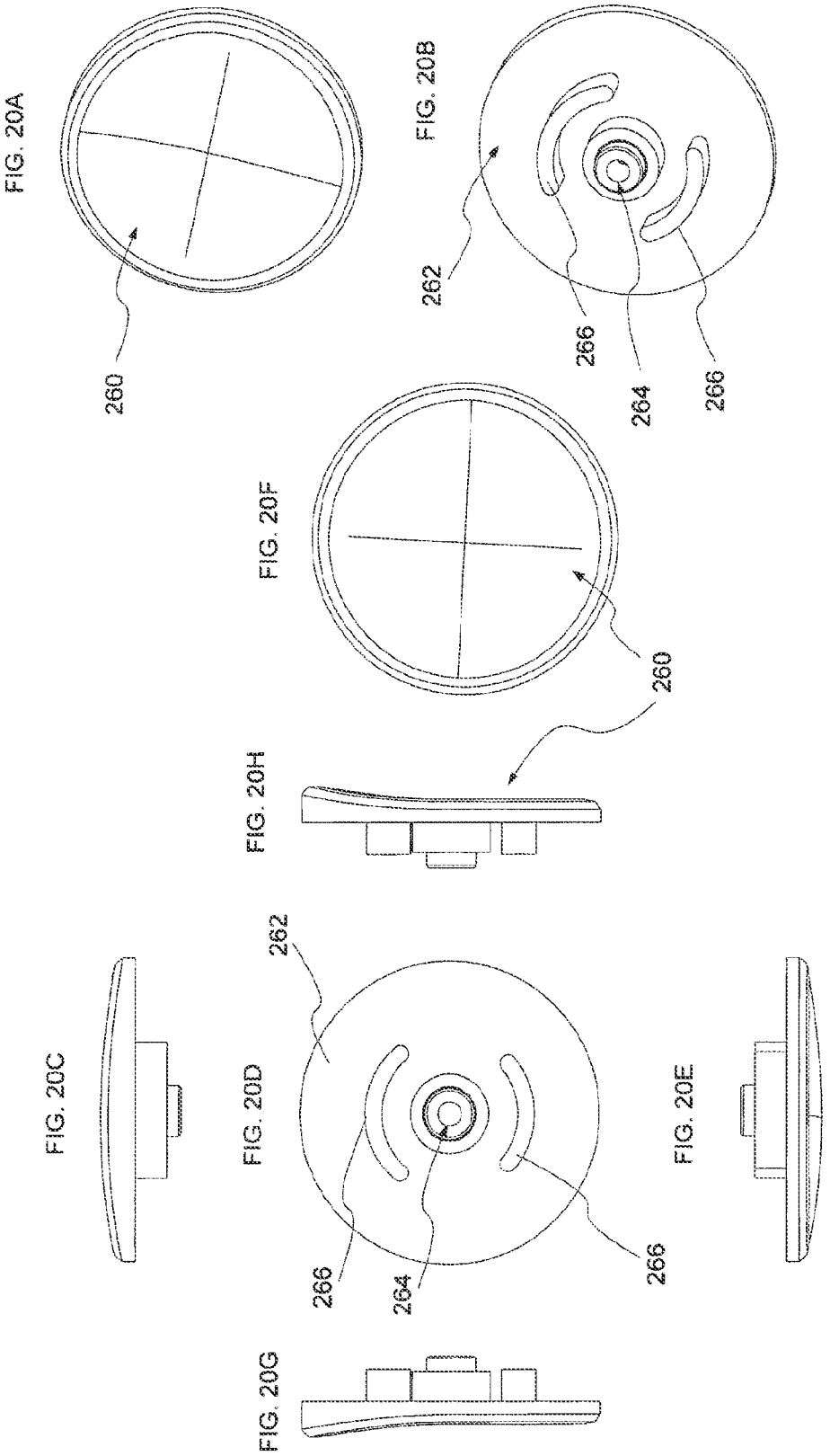
FIG. 15D
15A – 15A

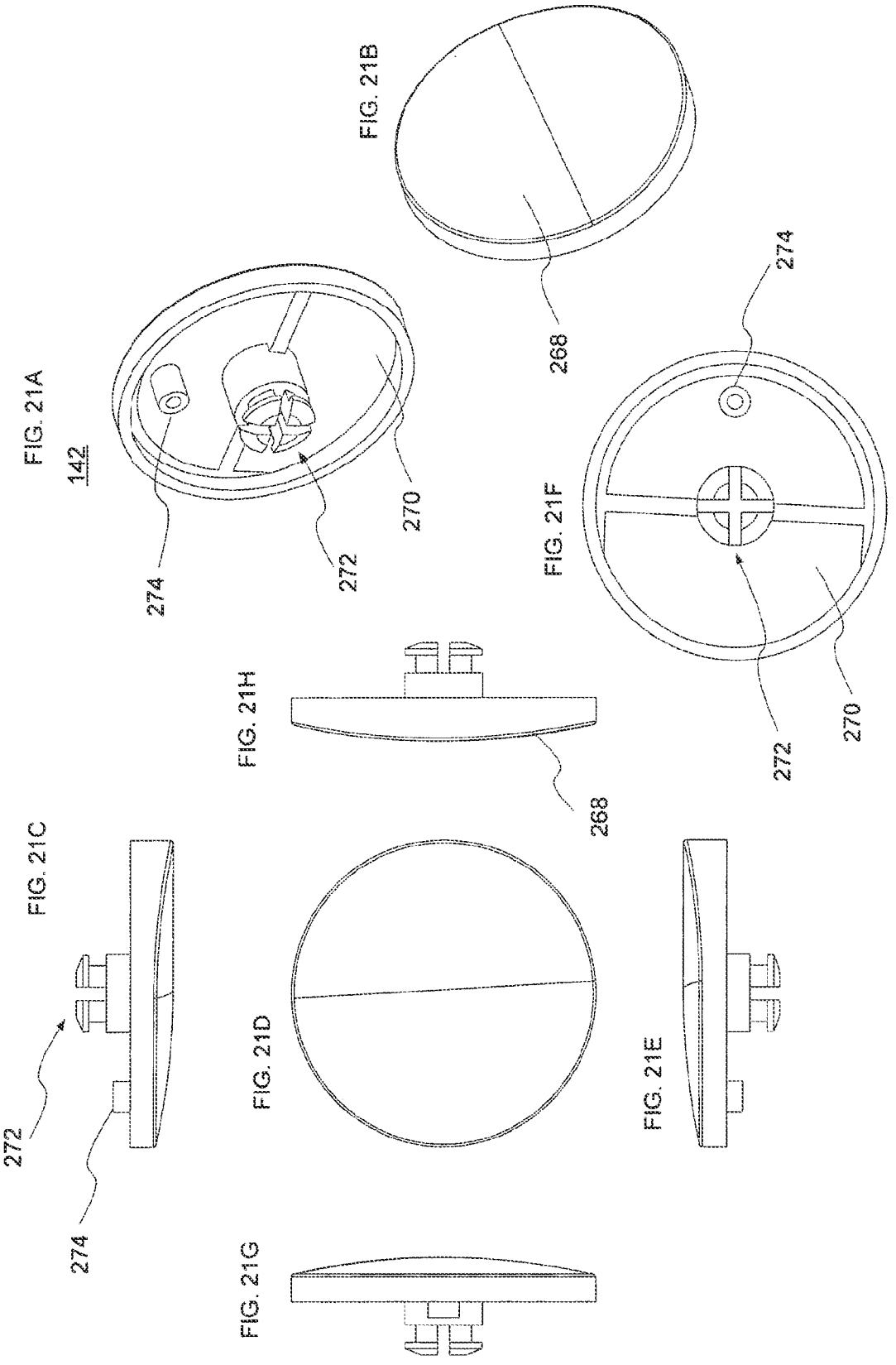

FIG. 16A
120
128
126
204
FIG. 16B
122'
FIG. 16C
16A
16A
FIG. 16D
16A – 16A
16B
16B'
FIG. 16E
16B – 16B
230
195
226


FIG. 17A
130
234
244
240
238
238
236
236
FIG. 17B
234
232
242
FIG. 17C
238
FIG. 17D
242
FIG. 17E
FIG. 17F
236
232
236
246
246
244
240
FIG. 17G
FIG. 17H


FIG. 18A
138
252
252
250
FIG. 18B
252
252
250
FIG. 18C
FIG. 18D
252
248
FIG. 18E
FIG. 18F
252
250
248
FIG. 18G
FIG. 18H


FIG. 19A
258
256
256
258
254
FIG. 19B
258
254
258
FIG. 19F
FIG. 19H
252
FIG. 19C
FIG. 19D
256
256
FIG. 19E
FIG. 19G


FIG. 20A
260
FIG. 20B
262
266
264
266
FIG. 20F
260
FIG. 20H
FIG. 20C
FIG. 20D
262
266
264
266
FIG. 20E
FIG. 20G


FIG. 21A
142
274
272
270
FIG. 21B
268
FIG. 21F
274
272
270
FIG. 21H
268
FIG. 21C
272
274
FIG. 21D
FIG. 21E
FIG. 21G

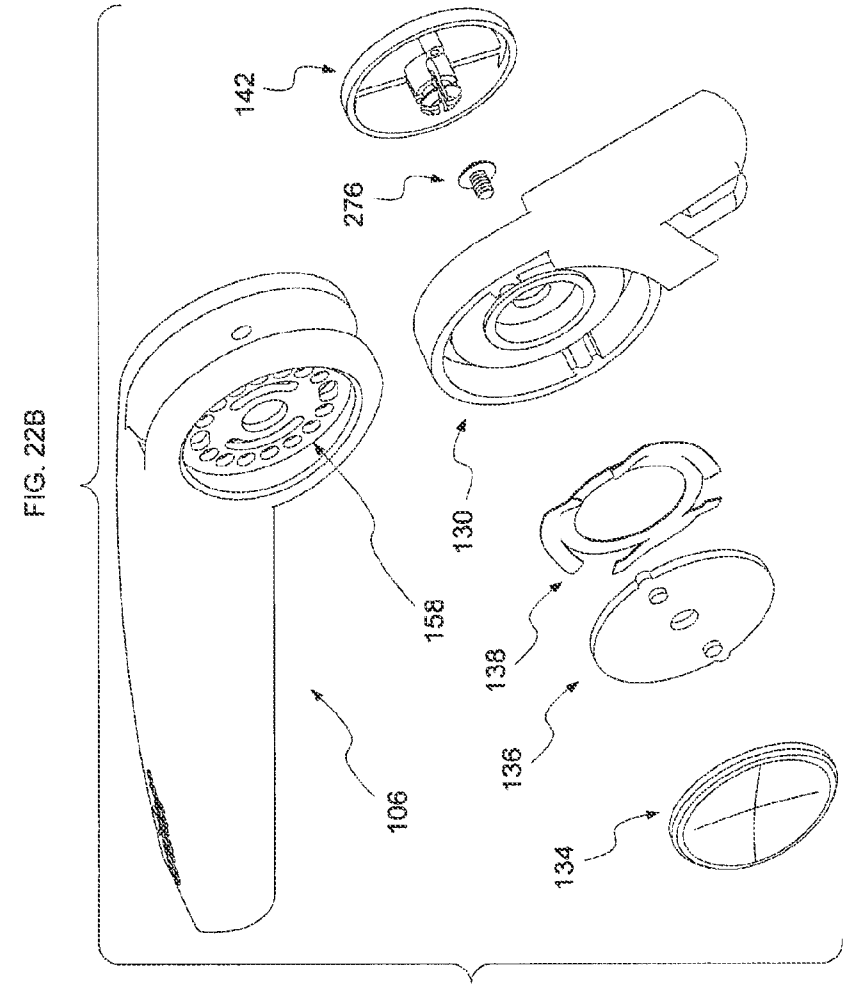


FIG. 22B

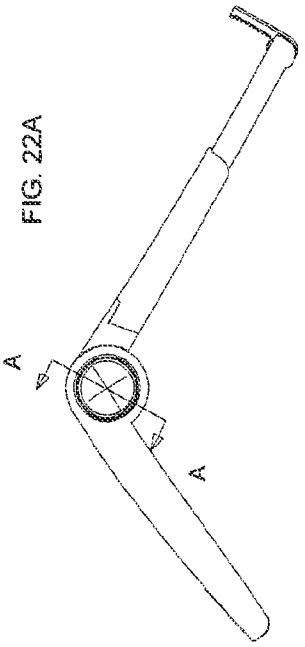


FIG. 22A

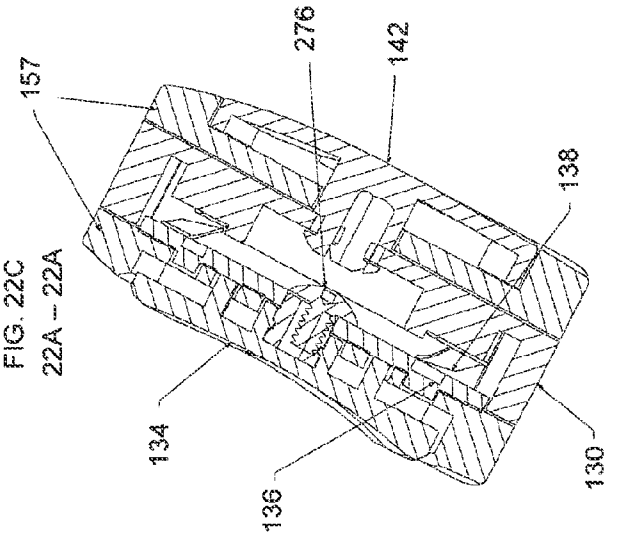


FIG. 22C
22A – 22A

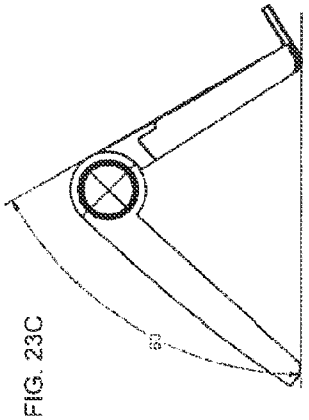


FIG. 23C

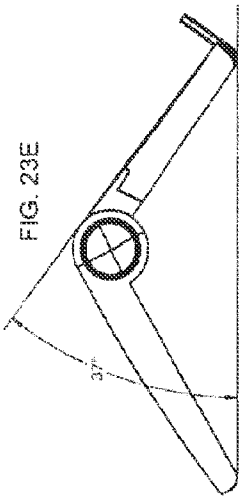


FIG. 23E

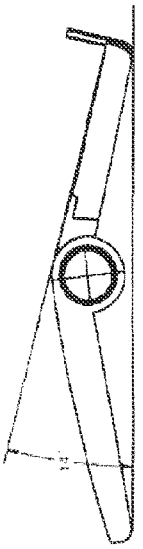


FIG. 23G

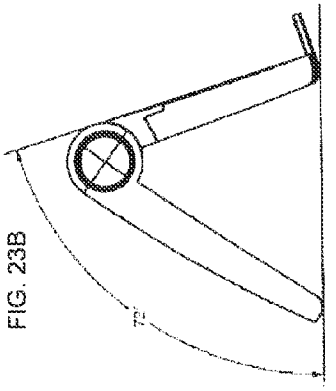


FIG. 23B

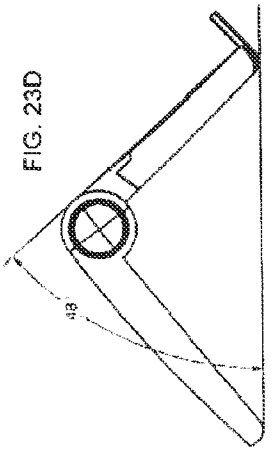


FIG. 23D

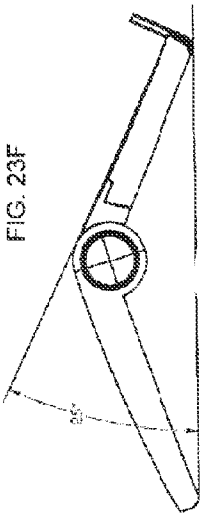


FIG. 23F

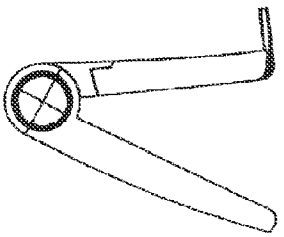


FIG. 23A

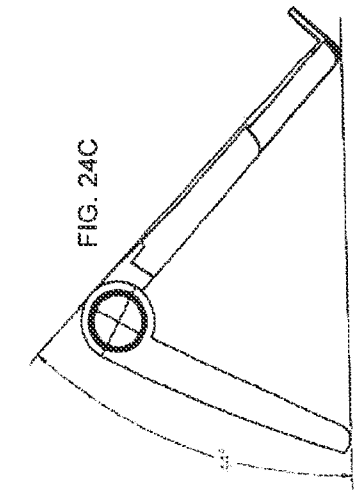


FIG. 24C

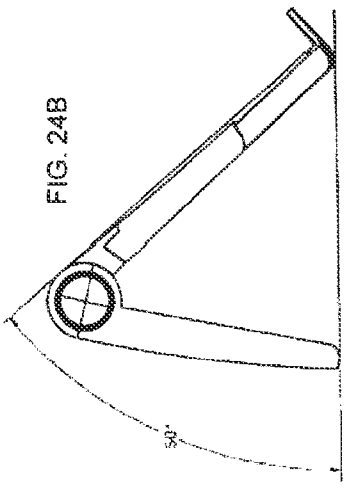


FIG. 24B

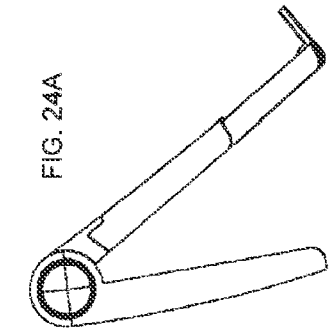


FIG. 24A

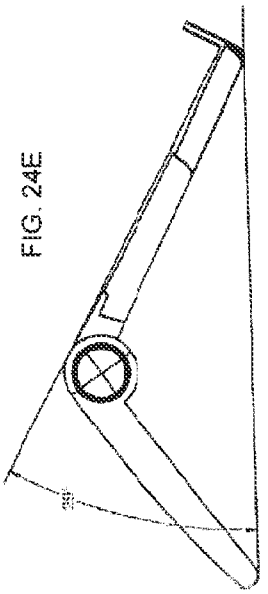


FIG. 24E

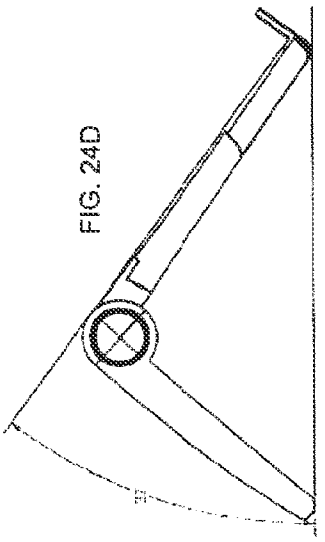


FIG. 24D

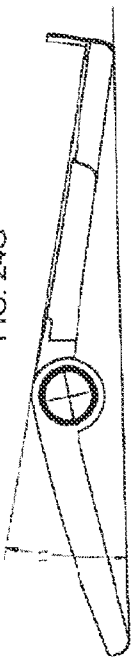


FIG. 24G

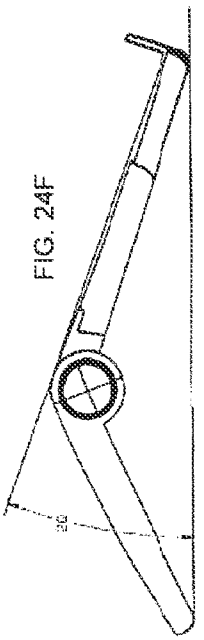


FIG. 24F

FOLDING SUPPORT STAND FOR PORTABLE ELECTRONIC DEVICES

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 11/789,692, filed Apr. 25, 2007.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a device for use in supporting and displaying electronic devices. More particularly, the present invention is particularly adapted for use as a portable support stand for use with laptop computers, tablet computers and other portable computing and entertainment devices and the like.

[0003] Laptop computers, tablet PCs and similar portable devices are often used in home and office environments, at tradeshows, offsite meetings, etc., and may be placed on a desk, table or other surface and used as a stand alone device or in conjunction with a docking station. Unfortunately, conveniences in size and portability may not be matched by proper ergonomics or convenience in the placement of such devices. For instance, when using a laptop, the keyboard should be positioned a comfortable distance from the user to avoid wrist, back and/or neck strain, but the display should be positioned at an appropriate distance and angle to avoid eye strain. These requirements may conflict, causing the user to choose between undesirable alternatives.

[0004] Therefore, it is desirable to provide solutions to ergonomics and other problems. For instance, it is possible to provide a support device for use with the laptop computer or other portable electronic device itself. The support device may take the form of an extension arm adapted for handling laptop computers. An example of an extension arm and supporting device for use with laptop computers is shown and described in U.S. Patent Publication No. 2004/0007651, entitled "Universal Support for Electronic Devices," the entire disclosure of which is fully incorporated by reference herein.

[0005] Another example of supporting apparatus for laptops and other portable electronic devices may be found in U.S. patent application Ser. No. 11/508,367, filed on Aug. 23, 2006 and entitled "Laptop Holder for Extension Arm," the entire disclosure of which is fully incorporated by reference herein. Yet another example of a laptop holder may be found in U.S. Design patent application Ser. No. 29/261,219, filed on Jun. 9, 2006 and entitled "Laptop Holder," the entire disclosure of which is fully incorporated by reference herein.

[0006] While such laptop extension arms and laptop holders are suitable for supporting laptop computers and the like, a need exists for support stands that can efficiently and stably support the user's device and while also being compact and easily portable.

SUMMARY OF THE INVENTION

[0007] In accordance with an embodiment of the present invention, a portable support stand for supporting an electronic device is provided. The stand comprises a first support leg, an adjustment member and a pair of adjustable support legs. The first support leg has an elongated body and a pivot member. The elongated body includes a first end for contacting a support surface and a second end remote from the first end. The pivot member is disposed adjacent the second end of the elongated body. The adjustment member is rotatably coupled to the pivot member of the first support leg. The pair of adjustable support legs each has a respective first leg member and a respective second leg member slideably attached to the respective first leg member thereof. Each first leg member has a first end pivotally coupled to the adjustment member, a second end remote from the first end and a receptacle disposed between the first and second ends. Each second leg member has first and second ends thereof. The second leg members is operable to move between a compact position in which the respective second leg member is substantially received within the receptacle of the respective first leg, as shown in FIGS. **15**A-**15**E, and an extended position in which the second leg member is substantially removed from the receptacle of the respective first leg member, as shown in FIGS. **16**A-**16**E. Furthermore, the pair of adjustable support legs is operable to jointly rotate between a closed position adjacent to the first support leg, as shown in FIGS. **4**A-**4**H, and an open position with the second ends of the first and second leg members spaced apart from the first end of the first support leg, as shown in FIGS. **3**A-**3**H.

[0008] In one alternative, the portable support stand further comprises a pair of stopper members that each has first and second ends. The first end of each stopper member is coupled to the second end of a respective one of the second leg members. Each stopper member is operable to move between a closed position with the second end of the stopper member adjacent the second end of the respective second leg member, as seen in FIGS. **15**A-**15**B, and an open position with the second end of the stopper member not adjacent the second end of the respective second leg member, as seen in FIGS. **16**A-**16**B.

[0009] In an example, the stopper members are rotatably coupled to the second ends of the respective second leg members, and the open position is substantially perpendicular to the closed position. In another example, the stopper members and the adjustment member each include a point of contact for supporting the electronic device at three points. In a further example, each stopper member includes means for producing an audible indicator to identify that the respective stopper member is in the open or closed position.

[0010] In another alternative, the pivot member includes a first engagement member and the adjustment member includes a second engagement member adjustably coupled to the first engagement member to lock the adjustable support legs in the closed position and in the open position, and to permit movement of the adjustable support legs between the closed and open positions. In one example, the first engagement member includes a plurality of connectors and the second engagement member includes at least one connection member operable to couple with a first one of the plurality of connectors in the closed position and with a second one of the plurality of connectors in the open position. In another example, the support stand further comprises a spring device disposed between the first and second engagement members.

[0011] In a further alternative, each of the adjustable support legs includes means for producing an audible indicator to identify when the respective adjustable support leg is in the compact or extended position.

[0012] In accordance with another embodiment of the present invention, a portable support stand for supporting an electronic device is provided. The stand comprises a first support leg, a pair of adjustable support legs and an adjustment member. The first support leg has an elongated body

including a first end for contacting a support surface and a second end remote from the first end. The adjustment member rotatably couples the pair of adjustable support legs to the second end of the first support leg. The adjustment member includes a first engagement member, a pivot device, a second engagement member, a spring device and an adjustment actuator. The first engagement member is coupled to the first support leg. The engagement member has a first surface including plurality of first connection members distributed about a central rotation point and at least one second connection member disposed in the first surface. The pivot device includes a first section adjustably coupled to the engagement member and a second section adjustably coupled to both first leg members. The second engagement member includes at least one connection member operable to releasably engage at least one of the first connection members of the first engagement member. The spring device is substantially disposed between the pivot device and the second engagement device. The adjustment actuator is coupled to the second engagement device. In operation, when the adjustment actuator is in a first state, the at least one connection member of the second engagement member is securely coupled to at least one of the first connection members of the first engagement member. And when the adjustment actuator is in a second state, the at least connection member of the second engagement member is decoupled from the at least one first connection member so that the pair of adjustable support legs is moveable between a closed position adjacent to the first support leg and an open position with the second ends of the first and second leg members spaced apart from the first end of the first support leg.

[0013] In one alternative, the pair of adjustable support legs each includes a first leg member and a second leg member slideably coupled to the respective first leg member thereof. The first support leg preferably has a fixed length.

[0014] In another alternative, the plurality of first connection members is desirably distributed in a circular arrangement about the central rotation point. In this case, the plurality of first connection members are most preferably receptacles, and the at least one connection member comprises at least one projection operable to releasably engage at least one respective connection members.

[0015] In a further alternative, the portable support stand additionally comprising at least one magnet received in the first support leg for magnetically securing the pair of adjustable support legs to the first support leg in the closed position.

[0016] In yet another alternative, the portable support stand further comprises a pair of stopper members. Here, a first one of the stopper members is coupled to a first one of the adjustable support legs and a second one of the stopper members is coupled to a second one of the adjustable support legs. The pair of stopper members is moveable between a compact position when the support stand is in the closed position and an extended position when the support stand is in the open position.

[0017] In one example, the electronic device is operable to rest on the support stand at three points when the support stand is in the open position. Here, the pair of stopper members each provides a first point of contact for the electronic device and the first support leg provides a second point of contact for the electronic device in a tripod arrangement.

[0018] In another example, when the stand is in the open position it has a double tripod configuration for supporting the electronic device and for contacting the support surface. Most preferably, in the double tripod configuration the first end of the first support leg provides a first point of contact with the support surface and the pair of stopper members each providing separate second points of contact with the support surface. And the second end of the first support leg providing a first point of contact for the user device and the pair of stopper members each provide separate second points of contact for the user device.

[0019] In accordance with a further embodiment of the present invention, a portable support stand for use with an electronic device comprises a first support leg, a pair of adjustable support leg and an adjusting means. The first support leg has an elongated body including a first end for contacting a support surface and a second end remote from the first end. The pair of adjustable support legs each has a first leg member and a second leg member slideably attached to the respective first leg member thereof. The adjusting means is for adjusting a position of the pair of adjustable support legs relative to the first support leg so that the portable support stand is configured in either a closed position or an open position. Furthermore, in the open position the support stand has a double tripod configuration for supporting the electronic device and for contacting the support surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The present invention will hereinafter be described in conjunction with the appended drawing figures wherein like numerals denote like elements.

[0021] FIGS. **1**A-**1**F illustrate a stand device supporting a laptop computer in accordance with aspects of the present invention.

[0022] FIGS. **2**A-**2**F illustrate the stand device of FIGS. **1**A-**1**F supporting a tablet PC in accordance with aspects of the present invention.

[0023] FIGS. **3**A-**3**H illustrate a portable stand in accordance with aspects of the present invention.

[0024] FIGS. **4**A-**4**H illustrate the portable stand of FIGS. **3**A-**3**F in a compact configuration in accordance with aspects of the present invention.

[0025] FIG. **5** illustrates an exploded view of the portable stand of FIGS. **3**A-**3**F in accordance with aspects of the present invention.

[0026] FIGS. **6**A-**6**H illustrate a first section of the portable stand of FIG. **5** in accordance with aspects of the present invention.

[0027] FIGS. **7**A-**7**H illustrate a second section of the portable stand of FIG. **5** in accordance with aspects of the present invention.

[0028] FIGS. **8**A-**8**H illustrate a grip member of the stand of FIG. **5** in accordance with aspects of the present invention.

[0029] FIGS. **9**A-**9**H illustrate a portion of a front leg of the stand in FIG. **5** in accordance with aspects of the present invention.

[0030] FIGS. **10**A-**10**H illustrate a second portion of the front leg of the stand in FIG. **5** in accordance with aspects of the present invention.

[0031] FIGS. **11**A-**11**P illustrate a third portion of the front leg of the stand in FIG. **5** in accordance with aspects of the present invention.

[0032] FIGS. **12**A-**12**P illustrate a fourth portion of the front leg of the stand in FIG. **5** in accordance with aspects of the present invention.

[0033] FIGS. **13**A-**13**H illustrate a stopper for use with the front legs of the stand in accordance with aspects of the present invention.

[0034] FIGS. **14**A-**14**D illustrate a lower leg assembly in accordance with aspects of the present invention.

[0035] FIGS. **15**A-**15**E illustrate a front leg assembly in a compact position in accordance with aspects of the present invention.

[0036] FIGS. **16**A-**16**E illustrate the front leg assembly of FIGS. **15**A-**15**E in an extended position in accordance with aspects of the present invention.

[0037] FIGS. **17**A-**17**H illustrate a portion of a pivot device in accordance with aspects of the present invention.

[0038] FIGS. **18**A-**18**H illustrate a spring device in accordance with aspects of the present invention.

[0039] FIGS. **19**A-**19**H illustrate an engagement member in accordance with aspects of the present invention.

[0040] FIGS. **20**A-**20**H illustrate an actuator in accordance with aspects of the present invention.

[0041] FIGS. **21**A-**21**H illustrate a cover in accordance with aspects of the present invention.

[0042] FIGS. **22**A-**22**C illustrate stand assembly in accordance with aspects of the present invention.

[0043] FIGS. **23**A-**23**G illustrate exemplary compact positioning of a stand in accordance with aspects of the present invention.

[0044] FIGS. **24**A-**24**G illustrate exemplary extended positioning of a stand in accordance with aspects of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0045] The aspects, features and advantages of the present invention will be appreciated when considered with reference to the following description of preferred embodiments and accompanying figures. In describing the preferred embodiments of the invention illustrated in the figures, specific terminology will be used for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, and it is to be understood that each term selected includes all technical equivalents that operate in a similar manner to accomplish a similar purpose.

[0046] As mentioned above, the present invention provides a portable support platform or stand that is suitable for use with laptop computers, tablet computers and other portable equipment. FIGS. **1**A-**1**F illustrate a laptop computer **10** that is supported by a stand **100**. FIGS. **2**A-**2**F illustrate the stand **100** supporting a tablet style personal computer ("tablet PC") **20**. As can be seen in the various views of FIGS. **1** and **2**, the stand **100** has a tripod-type configuration, which, as will be explained in more detail below, may be placed on many different surfaces in a wide variety of orientations and positions. This gives the user supreme flexibility in placing his or her laptop computer, tablet PC or other device in the exact arrangement desired. While the laptop computer **10** and tablet PC **20** are exemplary, the stand **100** may support portable devices of many different types and configurations, including but not limited to PDAs, personal stereos, pictures, etc.

[0047] FIGS. **3**A-**3**H illustrate the stand **100** in detail. As seen in the front and rear perspective views of FIGS. **3**A and **3**B, the stand **100** includes a pair of front legs **102** and **104** that are coupled to a rear leg **106**. The front legs **102** and **104** are preferably adjustable to varying lengths, which enables the stand **100** to accommodate devices of varying sizes and shapes. Furthermore, the front legs **102** and **104** may be adjusted independently of one another, which is particularly helpful when positioning the laptop or tablet PC on an uneven surface.

[0048] As shown in the views of FIGS. **3**A-**3**H, the front legs **102** and **104** preferably include a pair of stoppers **108***a,b*. The stoppers **108***a,b* help support the user device and prevent it from slipping off of the legs **102** and **104**. Preferably, the legs **102** and **104** have a bowed or curved upper surface. In this case, the laptop **10**, tablet PC **20** or other portable device will rest on the stand at three points, namely points A, B and C as shown in FIG. **3**A and FIG. **1**E. In addition to the overall open architecture, this bowed/curved tripod-type configuration promotes air circulation and cooling for the user device. Furthermore, by contacting the stand **100** at only three locations, this gives additional stability to the user device. This may be especially important for table PC-type devices or laptops where the user is writing on or typing on the device, where a wobbly device is especially undesirable.

[0049] Also shown in these figures is a pivot section **110**, which enables the legs **102** and **104** to rotatably move relative to the leg **106** from the "open" configuration shown to a "closed" configuration as illustrated in FIGS. **4**A-**4**H. In the closed configuration, it can be seen that the front legs **102** and **104** are placed in a compact parallel orientation as opposed to the extended angled configuration of FIGS. **3**A-**3**H. Furthermore, the legs **102** and **104** may be placed in parallel orientation with the leg **106** as well. Thus, in this arrangement, the stand **100** is not only compact, but is easily portable by the user. This makes the stand **100** very beneficial for people who are on the go and need a portable stand for their laptop or tablet PC which can be folded away when traveling or when it is otherwise not being used.

[0050] It can be seen in FIGS. **3** and **4** that the legs are moveable along two general paths or planes. In the first path, the front legs **102** and **104** are moveable relative to the rear leg. In the second path or plane, the front legs **102** and **104** are also moveable relative to one another. Thus, the user may carry the stand **100** in a compact configuration with all three legs together, and may then open up the stand **100** so that the legs are positioned in a tripod configuration.

[0051] FIG. **5** is an exploded view of the stand **100** in order to better illustrate various aspects of the stand. As seen in this figure, the legs **102**, **104** and **106**, as well as the pivot section **110**, may be formed from a number of discrete components. For example, the rear leg **106** may comprise a main body portion **112** and a pivot member **114**. The pivot member **114** may be integrally formed with the main body portion **112** or may be fabricated separately and connected to the main body portion **112**. The leg **106** may also include one or both of a support member **116** and a grip member **118**.

[0052] While not required, one or more magnets **119** may also be incorporated into the rear leg **106**. The magnet(s) **119** may be used to help secure the leg **106** to the legs **102** and **104** when the stand **100** is in a closed or folded up (compact) arrangement. Preferably, at least a portion of the legs **102** and **104** are metallic or magnetic. Thus, when the stand **100** is closed, for example for travel, the magnet **119** magnetically holds the legs **102** and **104** to the leg **106**. The magnet **119** need only be strong enough to hold the legs together without making it difficult for the user to detach the legs **102** and **104** from the leg **106**. Furthermore, when the legs are drawn together, they provide a pleasing sound, letting the user know the legs are full closed together.

[0053] The legs **102** and **104** are preferably substantially mirror images of one another and are configured for easy adjustment by the user. For example, each leg **102** and **104** desirably includes an upper leg portion **120** and an adjustable lower leg portion **122**. The upper leg portion **120** may include a cover section **124**. The lower leg portion **122** preferably includes a sliding member **126** and a slide stopping member **128**. The stoppers **108***a,b* are preferably coupled to one or both of the sliding member **126** and to the slide stopping member **128**.

[0054] The pivot section **110** preferably includes a central pivot **130**. The upper leg portions **120** are desirably adjustably coupled to the central pivot **130** by an adjustment mechanism such as pivot pin **132**. The pivot section **110** may also include an adjustment actuator such as push button **134**, an engagement member **136** and a spring device **138**. A fastener (not shown) and a cap **142** may also comprise part of the pivot section **110**.

[0055] Each of these components is illustrated in detail in the accompanying figures. For instance, FIGS. **6**A-**6**H illustrate the main body portion **112** and pivot member **114** of the rear leg **106**. As best seen in the perspective view of FIG. **6**A and the front view of FIG. **6**D, the main body portion **112** may include a cavity **144** formed generally by sidewalls **146***a,b* and rear wall **148**. The cavity **144** may include one or more receptacles **150** adapted to receive the magnets **119**. The magnets **119** are preferably employed to secure the legs **102** and **104** to the leg **106** when the stand **100** is in the fully closed position.

[0056] The pivot member **114** preferably includes an opening or receptacle **152** adapted to receive fastener **154** (see FIG. **5**). The fastener **154** may be, for instance, a screw which may threadedly engage the opening **152** and a threaded opening **156** in the support member **116** (see FIGS. **7**A and **7**C) to secure the support member **116** to the main body portion **112** of the rear leg **106**. The pivot member **114** also desirably includes a pair of "arms" or extensions **157**, which extend away from the main body portion **112** as shown in FIGS. **6**C and **6**D.

[0057] As best seen in FIGS. **6**A, **6**B and **6**E, the pivot member **114** preferably also includes an engagement member **158**. The engagement member **158** is preferably attached to or integrated with one of the extensions **157**. As part of the pivot section **110**, the engagement member **158** permits adjustment of the legs **102** and **104** relative to the rear leg **106**, as will be described in more detail below. The engagement member **158** is desirably circular in configuration, and may include a central opening **160** and a series of openings **162** distributed around the central opening. One or more elongated openings **163** may also be disposed along the engagement member **158** between the central opening **160** and the openings **162**. The other one of the extensions **157** preferably also includes a central opening **164** and an offset opening **165**, as shown in FIG. **6**F. The central opening **164** should be aligned with the central opening **160**.

[0058] FIGS. **7**A-**7**H illustrate the support member **116** in detail. As discussed above, the support member **116** preferably includes a threaded opening **156** so that the support member **116** may be secured to the main body portion **112** using a fastener. Other types of fasteners or connectors may be employed in lieu of a threaded screw. Alternatively, the support member **116** may be integrally molded or otherwise fabricated with the main body portion **112** to provide a unitary leg **106**. A central support **159** may extend longitudinally span the support member **116**.

[0059] FIGS. **8**A-**8**H illustrate the grip member **118** in various orientations. The grip member **118** may be formed of rubber, plastic or other slip-resistant material. The grip member **118** is preferably attached to the end of the leg **106**, for instance to the support member **116**, to the main body portion **112**, or to both. The configuration of the grip member **118** desirably includes a rounded surface **166** for contacting the support surface such as a desktop, although other configurations are possible. Alternatively, the member **118** may be replaced with another member having a non-gripping surface. This may be suitable for situations where it is desirable to move or reposition the stand **100** on a support surface.

[0060] In addition to the surface **166** of member **118**, the other two points of contact for the stand **100** on the support surface are preferably the stoppers **108**, as shown in the side view of FIG. **1**E. As with the member **118**, the stoppers **108** may include a gripping surface or a non-gripping surface. Preferably all three points of contact have either a gripping surface or a non-gripping surface. Thus, as seen in this figure, the stoppers **108** desirably provide two of the three resting points for the laptop **10**, tablet PC **20** or other portable device, and also desirably provide two of the three support points when the stand **100** contacts a support surface. Furthermore, one end of the rear leg **106**, such as at point A, preferably provides the third resting point for the user device with the other end of the rear leg **106**, such as at surface **166**, preferably provides the third support point when the stand **100** rests on a support surface. Thus, it can be seen that the stand **100** preferably provides a "double tripod" configuration in which the stand rests on three points when placed on a support surface and also provides three points on which the user device rests. This double tripod arrangement is maintained no matter what specific placement is used to support the user device, as shown in the examples of FIGS. **1-2** and **23-24**.

[0061] The legs **102** and **104**, as explained above, may include a number of components, including an upper leg portion **120** and an adjustable lower leg portion **122**. The upper leg portion **120** is illustrated in FIGS. **9**A-**9**H, and the cover section **124** is illustrated in FIGS. **10**A-**10**H. As the legs **102** and **104** are preferably substantially mirror images of one another, only the right leg components are illustrated in these figures.

[0062] For instance, as seen in the perspective views of FIGS. **9**A and **9**B, the upper leg portion **120** includes an elongated section **168** and a pivot section **170** adjacent thereto. The elongated section **168** preferably includes an opening **172** and a receptacle **174** that receive the adjustable lower leg portion **122**. Disposed on a side wall of the elongated section **168** is a connection point **176** adapted to receive a corresponding connection member **178** on the cover section **124**, which is shown in FIGS. **10**A and **10**D. While the elongated section **168** and the cover section **124** are shown as being separate components, it is possible to fabricate the upper leg portion **120** as a single, integral component.

[0063] As shown in FIGS. **9**A-**9**C and **9**E, the pivot section includes a receptacle **180**, which is adapted to receive the pivot pin **132**. Thus, when the leg **102** or **104** is connected to the central pivot **130**, the upper leg portion **120** is operable to pivot about the axis of the pivot pin **132**.

[0064] The lower leg portion **122**, in particular the sliding member **126** and the slide stopping member **128**, is illustrated in FIGS. **11** and **12**. In the embodiment shown in FIGS.

11A-11H, the sliding member **126** preferably includes an elongated slot **182** along the body of the sliding member, a pivot member **184** adjacent a first end of the sliding member, and a recess **186** adjacent a second end of the sliding member.

[0065] FIGS. **11**I-**11**P illustrate an alternative embodiment of the sliding member **126**, namely sliding member **126'**. The main differences between sliding member **126'** and sliding member **126** are the addition of a generally arcuate receptacle **185** adjacent a boss or pivot member **206**, as well a notch or cutout **187** adjacent the recess **186** at the second end of the sliding member.

[0066] In the embodiment shown in FIGS. **12**A-**12**H, The slide stopping member **128** preferably includes an elongated tab member **188** adapted to fit the elongated slot **182** of the sliding member **126**. An opening **190** is configured to receive the pivot member **184**, and a tab member **192** is adapted to connect to the recess **186**. The slide stopping member **128** preferably also includes a receptacle **194** for use with stopper **108**.

[0067] FIGS. **12**I-**12**P illustrate an alternative embodiment of the stopping member **128**, namely stopping member **128'**. Here, the stopping member **128'** includes a spring member **195**. The spring member **195** is preferably disposed at the end of the slide stopping member **128** opposite the end having the opening **190** and the receptacle **194**. More preferably, the spring member **195** is desirably an extension of or adjacent to the tab member **192**. A protrusion **208** and a spring member **210** are preferably also included as part of the stopping member **128'**.

[0068] The protrusion **208** and spring member **210** are used in conjunction with the stopper, as will be described in more detail below with regard to FIGS. **14**A-**14**D. The spring member **195** is used when sliding the lower leg portion **122'** in and out of the upper leg portion **120**, as will be described in more detail below with regard to FIGS. **15**A-**15**E.

[0069] While the sliding member **126** or **126'** and the slide stopping member **128** or **128'** are shown as being separate components, it is possible to fabricate the lower leg portion **122** as a single, integral component. Furthermore, while only right lower leg components are shown, the left lower leg components are substantially identical in configuration.

[0070] FIGS. **13**A-H illustrate the stopper **108** for use with the right leg including sliding member **126** and stopping member **128**, with the stopper **108** for use with the left leg being a mirror image of the right. As best seen in the perspective view of FIG. **13**A and the rear view of FIG. **13**D, the stopper **108** preferably includes a gripping or friction surface **196** along leg **198**, as well as a through hole **200** and a protrusion **202** on pivot section **204**.

[0071] The through hole **200** receives the pivot member **184** and may be secured thereto by a fastener such as a threaded screw or bolt. The protrusion **202** is received by the receptacle **194**. The stopper **108** may be adjusted between a closed position, for instance when the stand **100** is folded up, and an open position, for instance when the stand **100** is ready for use. The range of motion of the leg **198** depends upon the track provided by the receptacle **194** for the protrusion **202**. Thus, the leg may be configured to range, for example, along a 90.degree. path between the open and closed positions. Other path ranges may be employed, by way of example only between 45.degree. and 135.degree. Wider or narrower ranges may also be employed.

[0072] An alternative embodiment of the lower leg portion and the stopper is illustrated in FIGS. **14**A-D, which illustrates sliding member **126'** and stopping member **128'** as part of lower leg **122'**. In this embodiment, stopper **108'** pivotally couples to lower leg **122'** so that an audible indicator is generated upon extension and retraction of the stopper **108'**. FIGS. **14**A and **14**B illustrate perspective views of the leg **102** or **104** in an extended position.

[0073] FIG. **14**C is an enlarged view of section A-A from FIG. **14**A. Here, it can be seen that the lower leg **122'** preferably includes a boss **206**, a protrusion **208**, and a spring member **210**. As shown, the spring member **210** is preferably attached at one end **212** to the lower leg **122'** but has a second end **214** free to flex as the stopper **108'** moves.

[0074] As with the stopper **108**, the stopper **108'** may be coupled to the lower leg **122'** using a fastener such as a threaded screw or bolt **216**. FIG. **14**D is an enlarged view of the stopper **108**, showing the pivot section **204** having through hole **200**, a first receptacle **218** and a second receptacle **220**. When the stopper **108'** is coupled to the lower leg **122'**, the first receptacle receives the protrusion **208**, and the second end **214** of the spring member **210** is received by the second receptacle **220**.

[0075] FIG. **14**D illustrates that the second receptacle preferably includes a raised member such as ramp **222**. Thus, as the stopper **108'** is adjusted between the open and closed positions, the second end **214** of the spring member **210** passes across the ramp **222**. While passing over the ramp **222**, the second end **214** is preferably compressed. And after passing beyond the ramp **222**, the second end **214** preferably snaps into back into an uncompressed state, which desirably creates a clicking or other sound. This audible indicator lets the user know that the stopper **108'** is now in the fully extended or fully closed position.

[0076] FIGS. **15** and **16** illustrate details of the legs **102** and **104** when in the closed and open positions, respectively. As seen in the closed views of FIGS. **15**A-**15**C, the lower leg portion **122'** (or **122**) is retracted within the upper leg portion **120**, specifically within the cavity **144**. FIG. **15**D illustrates a cutaway of the leg **102** or **104** taken along the **15**A-**15**A line of FIG. **15**C. As can be seen in this view, the lower leg portion **122** preferably includes a groove **224**, and the cover section **124** preferably includes a stopping member **226**.

[0077] FIG. **15**E is an enlarged view taken about the **15**B-**15**B section of FIG. **15**D. Here, the spring member **195** of the lower leg portion **122'** is shown adjacent to a projection **228** that is preferably molded into the upper leg portion **120**. The projection **228** desirably abuts the spring member **195** and prevents removal of the lower leg portion **122** from the upper leg portion **120**, unless sufficient force is applied to bend the spring member **195** to clear the projection **228**. Once a sufficient amount of force is applied, for example by pulling on an exposed section of the lower leg portion **122**, the lower leg portion may be partly or fully extended. While only one projection **228** is illustrated, any number of projections **228** may be employed to permit graduated extension of the lower leg portion **122**.

[0078] FIGS. **16**A-**16**E illustrate the leg **102** or **104** in the fully open position. FIG. **16**D illustrates a cutaway of the leg **102** or **104** taken along the **16**A-**16**A line of FIG. **16**C, and FIG. **16**E is an enlarged view taken about the **16**B-**16**B section of FIG. **16**D. As best seen in FIG. **16**E, the stopping member **226** prevents further extension of the lower leg portion **122**. Also, the upper leg portion preferably also includes another projection, namely projection **230**. As the lower leg portion **122** is extended, the spring member **195** is deflected

during its pass across the projection **230**. Once it reaches full extension, the spring member **195** clears the projection **230**, creating an audible indicator such as a clicking sound. This sound, as with the audible indicator created by interaction of the stopper **108'** and the spring member **210** as discussed above. Thus, these two separate audible indicators let the user know that the lower leg portions **122** are fully extended and the stoppers **108'** are also fully extended.

[0079] A discussion of various components and assembly of the pivot section **110** will now be presented with regard to FIGS. **17-22**. As explained above, the pivot section **110** preferably includes a pivot device such as central pivot **130**, which is illustrated in FIGS. **17**A-**17**H. The perspective views of FIGS. **17**A and **17**B show that the central pivot **130** includes two main sections, namely a leg connection section **232** and a pivot member **234**.

[0080] The leg connection section **232** preferably includes a pair of projections **236** each having a receptacle **238** therein adapted to receive the pivot pin **132**. The pivot sections **170** of the upper leg portions **120** of the legs **102** and **104** are secured between the projections **236** and are permitted to pivot about the axis of the pivot pin **132**.

[0081] The pivot member **234** is preferably circular from an aesthetic viewpoint and to reduce the amount of material required during manufacturing. The pivot member **234** includes a receptacle **240** having a central opening **242**. As seen in FIGS. **17**A and **17**F, the receptacle **240** may also include an annular protrusion **244** and one or more holders **246**.

[0082] FIGS. **18**A-**18**H illustrate the spring device **138**, which includes a circular central portion **248** that is adapted to fit about the annular protrusion **244**. The spring device **138**, which desirably has a finger disc spring configuration, preferably also includes one or more projections **250** that may be spaced around the central portion **248**. Each projection **250** preferably includes a pair of extensions **252** angled away from the plane of the central portion **248**.

[0083] FIGS. **19**A-**19**H illustrate the engagement member **136**, which may have a washer-type configuration. As shown, the engagement member **136** is generally circular in shape, and includes opening **254** therein. One or more projections **256** are preferably disposed along one face of the engagement member **136**. And one or more extensions **258** may project along the edge of the engagement member **136**.

[0084] The adjustment actuator **134** is illustrated in FIGS. **20**A-**20**H. As shown, the adjustment actuator **134** has a generally circular configuration having a first side **260** and a second side **262**. The first side **260**, which is the side accessible to the user, desirably has a generally rounded or concave surface, although other any other shape is permissible. As seen in FIGS. **20**G and **20**H, the first side **260** need not be symmetrical. The second side **262** preferably includes a boss **264** and one or more elongated ridges **266**, which are adapted to fit within the elongated openings **163** of the engagement member **158**.

[0085] FIGS. **21**A-H illustrate the cap **142**. As shown, the cap **142** includes a first side **268** and a second side **270**. The first side **268** may have an exterior surface of any shape, although it is preferably generally convex as shown. The second side **270** desirably has a receptacle section **272** and a projection **274**.

[0086] Assembly of the pivot section **110** will be discussed with regard to FIGS. **22**A-**22**C. FIG. **22**A is a side view of the stand **100** and FIG. **22**B is an exploded view of the pivot section **110**. Assembly may be achieved as follows. First, the spring device **138** and engagement member **136** are pressed into the receptacle **240** of the pivot member **234**. The extensions **252** of the projections **250** preferably face the engagement member **136**. The extensions **258** of the engagement member **136** fit in the holders **246** of the pivot member **234**. Once the spring device **138** and engagement member **136** are received by receptacle **240**, then the pivot member **234** is fitted between the extensions **157** of the pivot member **114**. At this step, the projections **256** engage respective openings **162** on the engagement member **158**.

[0087] The adjustment actuator **134** may now be fitted over the engagement member **158**, with the elongated ridges **266** fitting within the elongated openings **163** of the engagement member **158**. Then a fastener such as a screw **276** is fitted through the openings **242** and **254** and is secured to boss **264** of the adjustment actuator **134**. At this point, the cap **142** may be fitted over the fastener **276**, with the receptacle section **272** covering the fastener and securing the cap **142** to the fastener, while the projection **274** engages the offset opening **165** of one of the extensions **157**.

[0088] FIG. **22**C is a cutaway view along the **22**A-**22**A line of FIG. **22**A. The cutaway view illustrates the relative positioning of the components of the pivot section **110**. In order to open and close the stand's legs, the pivot section **110** may be operated as follows. First, the user may press the adjustment actuator **134** in toward the cap **142**. This pushes on the engagement member **136**, which cause compression of the spring device **138**. This results in disengagement of the projections **256** from the openings **162** on the engagement member **158**. The user is now able to adjust the legs **102** and **104** relative to the rear leg **106**. When the adjustment actuator **134** is released, pressure from the spring device **138** forces the projections **256** to press against the engagement member **158**. Aligning the projections **256** with respective openings **162** secures the legs **102** and **104** in a fixed position relative to the leg **106**.

[0089] Once assembled, the stand **100** may be used in a wide range of positions and orientations. For instance, FIGS. **23**A-**23**G illustrate numerous positions when the legs **102** and **104** are in a compact configuration. The displacement between the front legs **102** and **104** with respect to the rear leg **106** may range from a fully closed position of 0.degree. to a minimally open position shown in FIG. **23**A with the legs **102** and **104** being on the order of 150 or less from the leg **106** to a substantially fully extended position shown in FIG. **23**G with the legs **102** and **104** being nearly 165.degree.-180. degree. from the leg **106**. Any incremental range may be provided between the minimally open position to the substantially fully extended position. By way of example only, increments of 1.degree., 2.degree., 3.degree., 4.degree., 5.degree., 10.degree., 15.degree. or 20.degree. may be provided. The specific incremental positions preferably directly correspond with the spacing and placement of the series of openings **162** in the engagement member **158**.

[0090] FIGS. **24**A-**24**G numerous positions when the legs **102** and **104** are in a fully extended configuration. As with the compact arrangement, the displacement between the front legs **102** and **104** with respect to the rear leg **106** may range from a fully closed position of 0.degree. to a minimally open position shown in FIG. **24**A with the legs **102** and **104** being on the order of 15.degree. or less from the leg **106** to a

substantially fully extended position shown in FIG. **24**G with the legs **102** and **104** being on the order of 165.degree.-180. degree. from the leg **106**.

[0091] Although the invention herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present invention. For instance, the stand may or may not include audible indicators, or may incorporate visual or textural indicators in lieu of or in conjunction of the audible indicators. Furthermore, the lower leg portions may be adjustable only between the fully closed and fully opened positions, or may be adjustable among any number of increments between fully closed and fully opened. All features in any of the embodiments are usable with all other embodiments presented herein. It is therefore to be understood that numerous modifications may be made to the illustrative embodiments and that other arrangements may be devised without departing from the spirit and scope of the present invention as defined by the appended claims.

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
7. (canceled)
8. (canceled)
9. (canceled)
10. (canceled)
11. (canceled)
12. (canceled)
13. (canceled)
14. (canceled)
15. (canceled)
16. (canceled)
17. (canceled)
18. (canceled)
19. (canceled)
20. (canceled)

21. A pivot mechanism for connecting two or more members together comprising:

a first engagement member having at least two connectors spaced from the perimeter thereof, with a first connector corresponding to a first position and a second connector corresponding to a second position;

a second engagement member having at least one connector for mating with either the first connector or the second connector of the first engagement member;

a spring coupled to the first and second engagement members for normally biasing the second engagement member into association with the first engagement member; and

an actuator for depressing the spring to disengage the at least one connector of the second engagement member from the connectors of the first engagement member in order to allow the first engagement member to move relative to the second engagement member from at least the first position to the second position and back, wherein when the actuator is depressed, the first engagement member is disengaged from the second engagement member, and when the actuator is released, the spring acts to bias the second engagement member toward the first engagement member to couple the first and second engagement members together.

22. The pivot mechanism of claim **1**, wherein the at least two connectors of the first engagement member are openings defined therein and the at least one connector of the second engagement member is a projection.

23. The pivot mechanism of claim **2**, wherein the first engagement member is substantially circular and the second engagement member is substantially circular, and the at least two openings in the first engagement member comprise a plurality of openings spaced around the center of the first engagement member; and the second engagement member has two projections for mating with a subset of the openings defined in the first engagement member.

24. The pivot mechanism of claim **1**, wherein the spring is a finger spring washer.

25. The pivot mechanism of claim **1**, wherein the spring is positioned adjacent the second engagement member and is not in contact with the first engagement member.

26. The pivot mechanism of claim **1**, wherein the actuator includes a projection for engaging the second engagement member to depress the spring.

27. The pivot mechanism of claim **6**, wherein the first engagement member includes at least one elongated opening extending therethrough and the actuator includes a projection for extending through the at least one elongated opening and for contacting the second engagement member.

28. The pivot mechanism of claim **1**, further comprising a first member having two arms that define a channel therebetween and a second member configured to seat in the channel, with one of the arms of the first member defining a recess for the first engagement member and the actuator, and the second member defining a recess for accepting the second engagement member and the spring, wherein the first member and the second member align along a center line of axial rotation.

29. The pivot mechanism of claim **8**, further comprising a cap for seating on an exterior surface of the one of the arms of the first member on a side that is opposite the actuator, said cap being fixedly coupled to the arm.

30. The pivot mechanism of claim **8**, wherein the actuator includes a centrally disposed boss and the actuator, first engagement member, second engagement member, spring, and second member are axially coupled together with a fastener that extends therethrough and engages the boss.

31. The pivot mechanism of claim **8**, wherein the first engagement member is integrally defined within one of the arms of the first member.

32. A pivot mechanism defining a central pivoting axis comprising:

a first engagement member axially aligned with the central pivoting axis;

a second engagement member axially aligned with the central pivoting axis and configured to lockingly couple to the first engagement member when in a first position and to disengage from the first engagement member when in a second position; and

a finger spring coupled to the first and second engagement members, wherein when the spring is depressed, the second engagement member is disengaged from the first engagement member to allow movement from the first position to the second position; and

a housing for holding the first engagement member, the second engagement member, and the finger spring,

wherein the housing has a first part and a second part that are rotatable relative to one another about the central pivoting axis.

33. The pivot mechanism of claim **12**, wherein the first engagement member is coupled to the first part of the housing and the second engagement member and spring are coupled to the second part of the housing.

34. The pivot mechanism of claim **12**, wherein the first engagement member is integral with the first part of the housing and the second engagement member and spring seat in a recess defined in the second part of the housing.

35. The pivot mechanism of claim **12**, wherein the second engagement member is rotatable relative to the first engagement member, and the finger spring normally biases the second engagement member into engagement with the first engagement member.

36. The pivot mechanism of claim **12**, further comprising an actuator coupled thereto for moving the second engagement member out of engagement with the first engagement member.

37. The pivot mechanism of claim **16**, wherein the actuator is positioned adjacent the first engagement member, the second engagement member is positioned adjacent the first engagement member, and the spring is positioned adjacent the second engagement member.

38. The pivot mechanism of claim **12**, wherein the first engagement member includes at least one recess defined therethrough and the actuator includes at least one ridge sized to extend through the at least one recess defined in the first engagement member to contact the second engagement member.

39. An adjustment member for coupling a first leg of a device to a second leg of a device comprising:

a first engagement member coupled to the first leg, the first engagement member having a first surface including a plurality of first connection members distributed about a central rotation point;

a pivot device associated with the second leg including a first section adjustably coupled to the first engagement member;

a second engagement member including at least one connection member operable to releasably engage at least one of the first connection members of the first engagement member;

a spring device substantially disposed between the pivot device and the second engagement member; and

an adjustment actuator coupled to the second engagement member, wherein when the adjustment actuator is in a first state the at least one connection member of the second engagement member is securely coupled to at least one of the first connection members of the first engagement member, and when the adjustment actuator is in a second state the at least connection member of the second engagement member is decoupled from the at least one first connection member so that the second leg is moveable between a closed position and an open position, wherein the spring device is adapted to bias the adjustment actuator in the first state.

40. The adjustment member of claim **19**, wherein the second leg is coupled to at least two adjustable support legs.

* * * * *