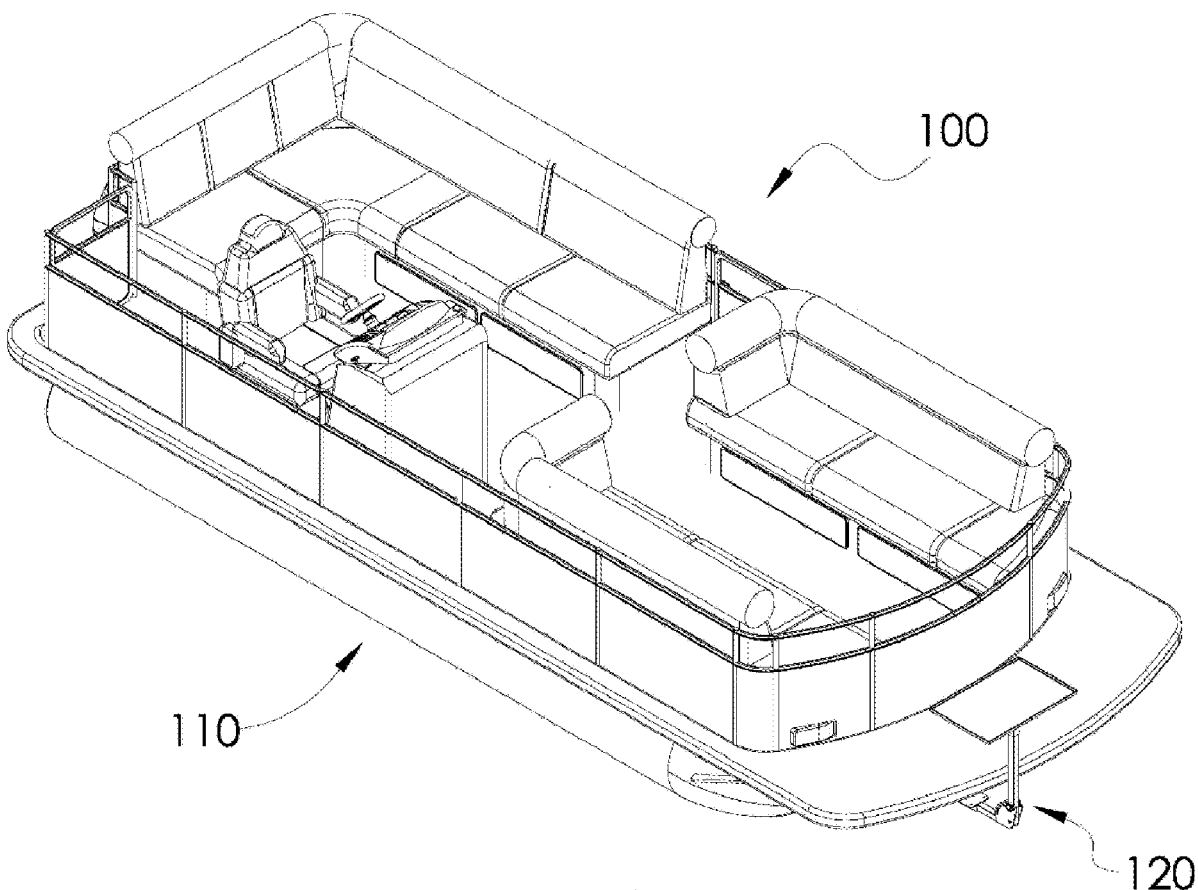




US 20230028985A1

(19) **United States**(12) **Patent Application Publication**
Guilbeau(10) **Pub. No.: US 2023/0028985 A1**(43) **Pub. Date: Jan. 26, 2023**(54) **FOLDABLE PLATFORM AND METHOD OF USE**(71) Applicant: **James Robert Guilbeau**, Granby, MA (US)(72) Inventor: **James Robert Guilbeau**, Granby, MA (US)(21) Appl. No.: **17/383,412**(22) Filed: **Jul. 22, 2021****Publication Classification**(51) **Int. Cl.**
B63B 29/04 (2006.01)
A47B 3/00 (2006.01)(52) **U.S. Cl.**CPC **B63B 29/04** (2013.01); **A47B 3/002** (2013.01); **B63B 2029/046** (2013.01)(57) **ABSTRACT**

An attachment device, along with associated components, and method of use are disclosed. The attachment device may be foldable, such as for stowing when not in use or for removal and storage. The device may include a connector, a platform, an at least one mounting bracket or other mounting feature. The connector component may be foldable or rotatable, or other components within the device may be foldable or rotatable or including rotating or other similar connection features. The connector may include a long arm and a short arm. The arms, or the orientation of the connector, may be inverted so as to allow different locations of the platform or other connected component or feature when the device is in a deployed configuration.



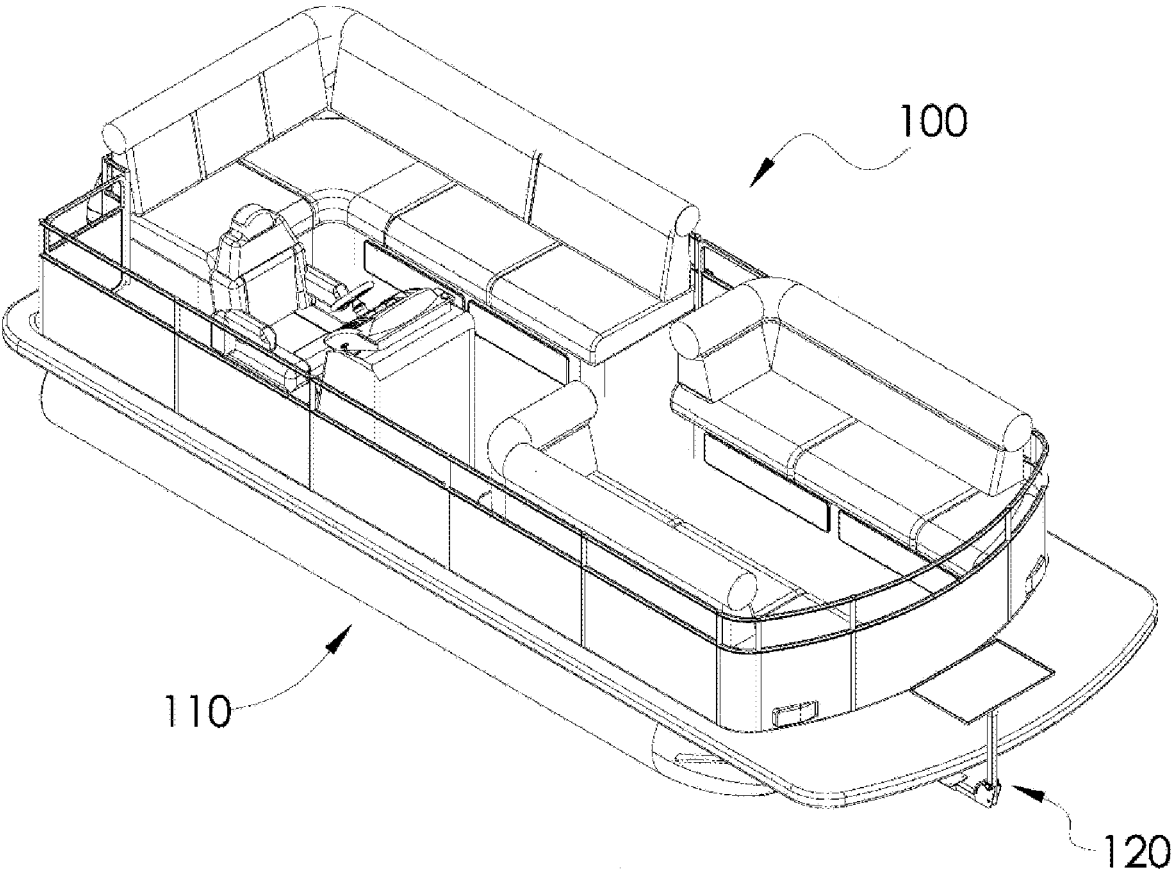


FIG. 1

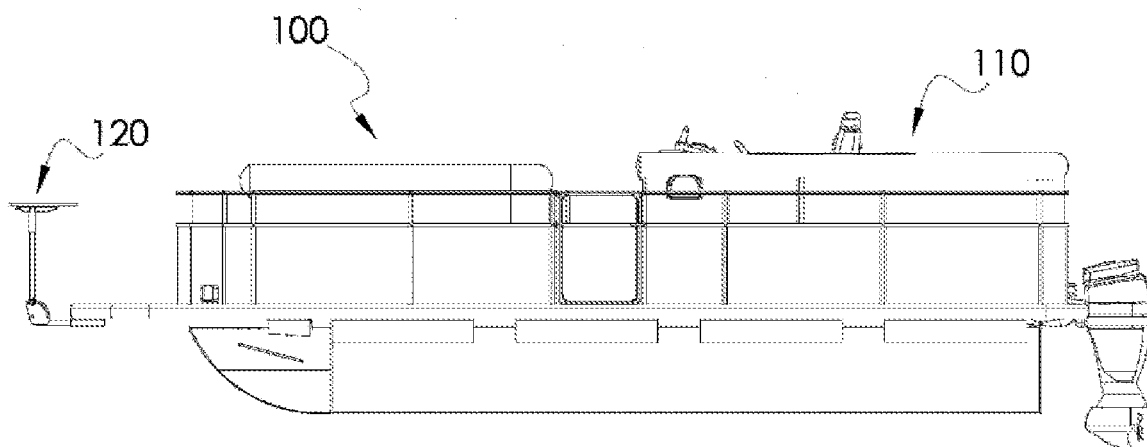


FIG. 2

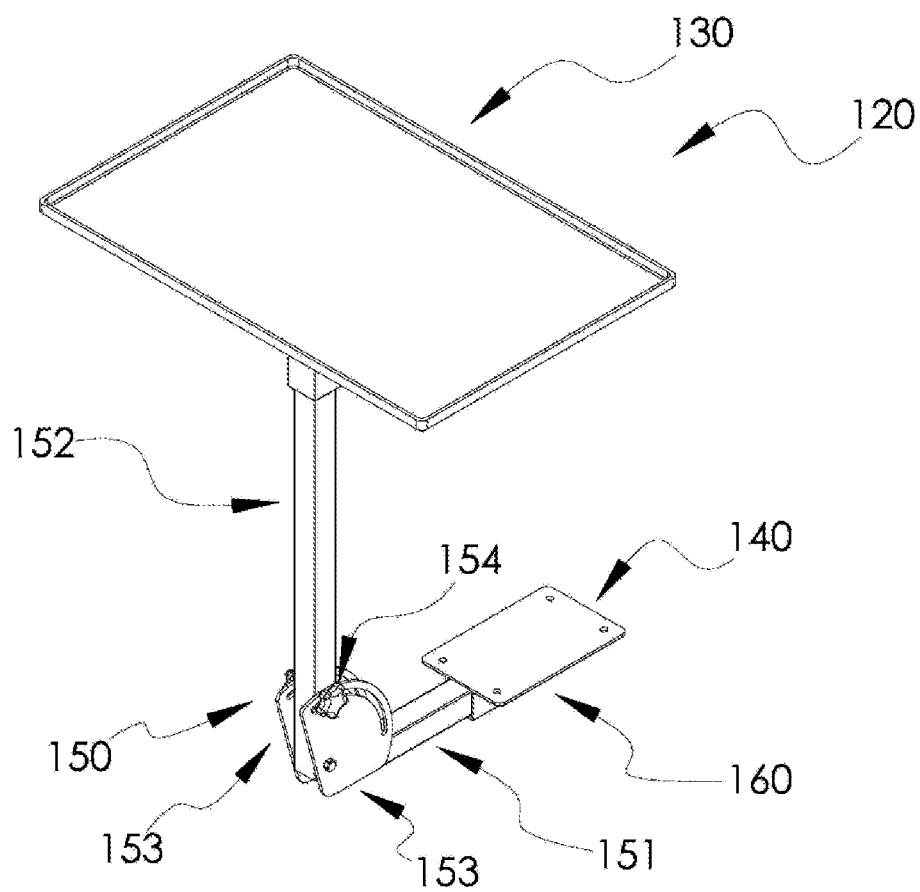


FIG. 3

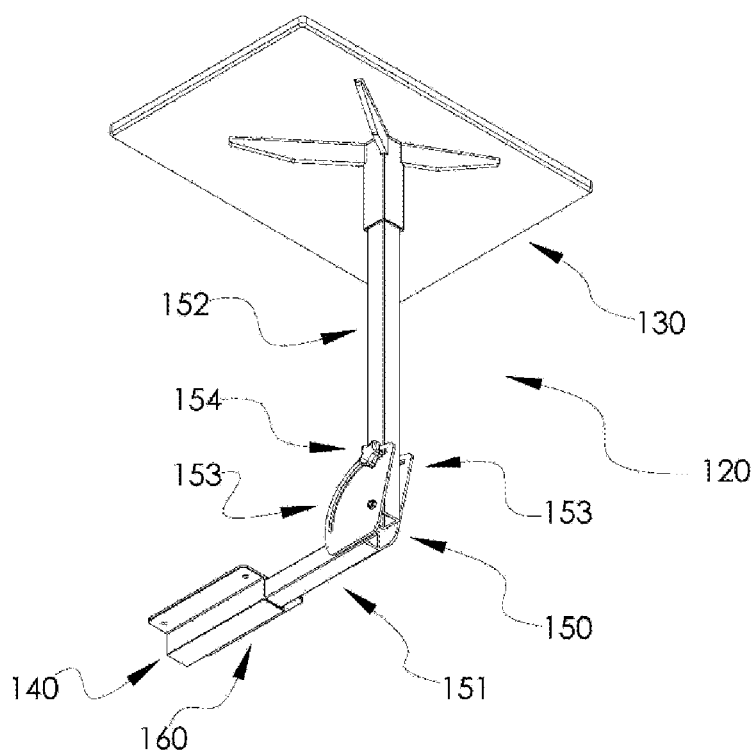


FIG. 4

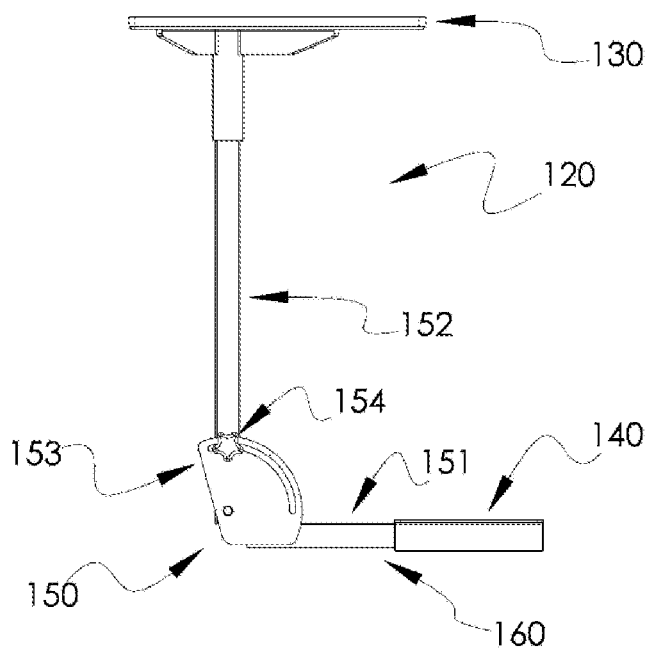


FIG. 5

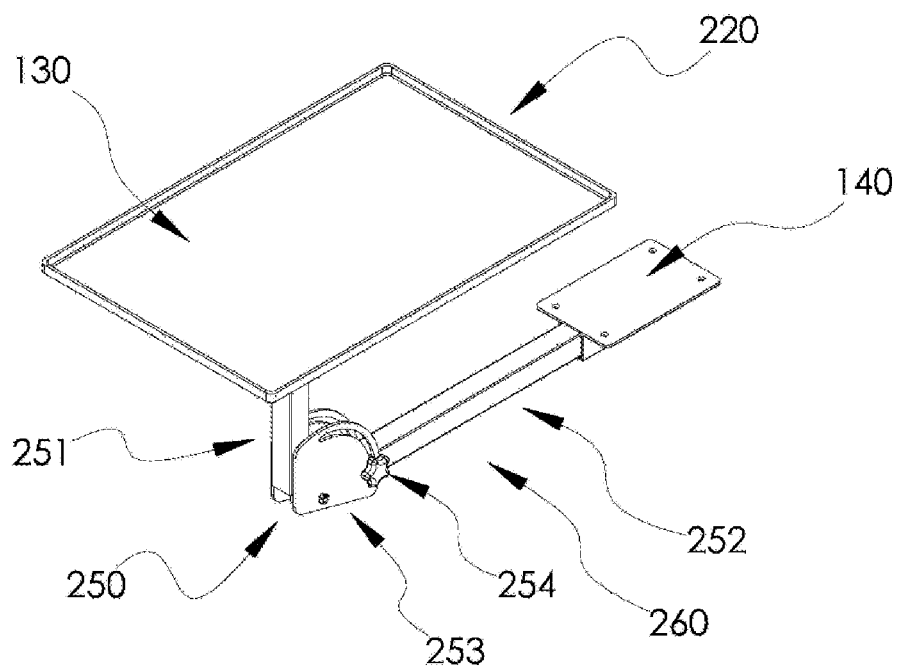


FIG. 6

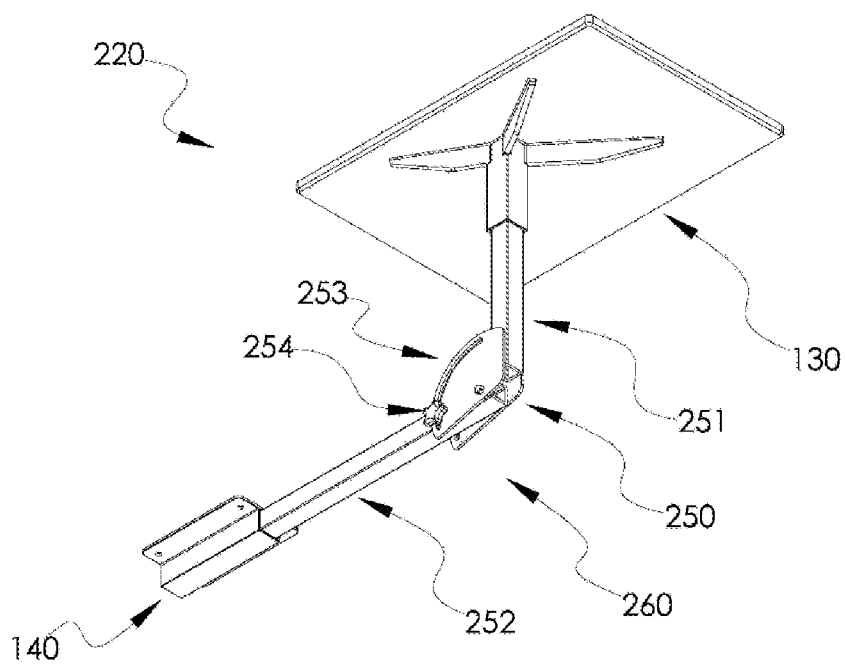


FIG. 7

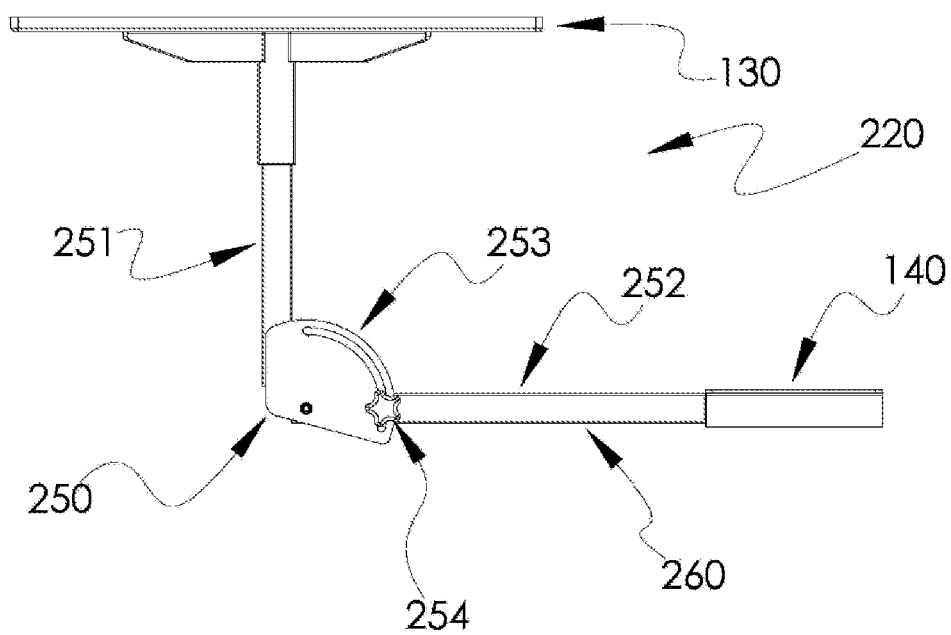


FIG. 8

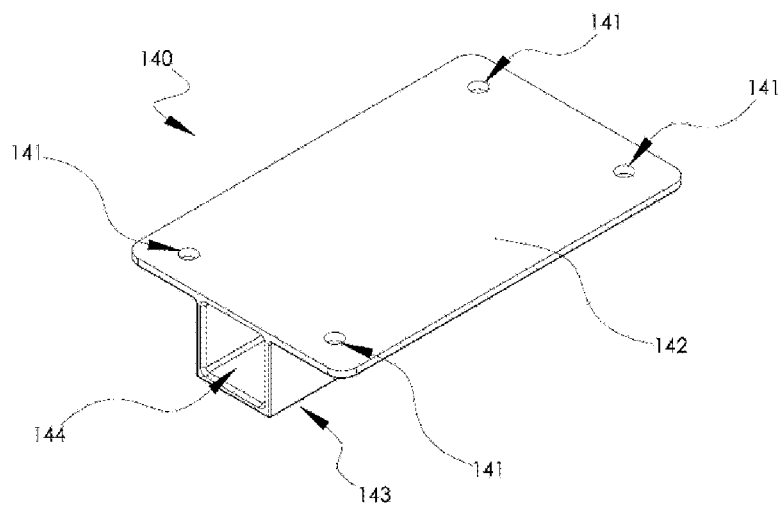


FIG. 9

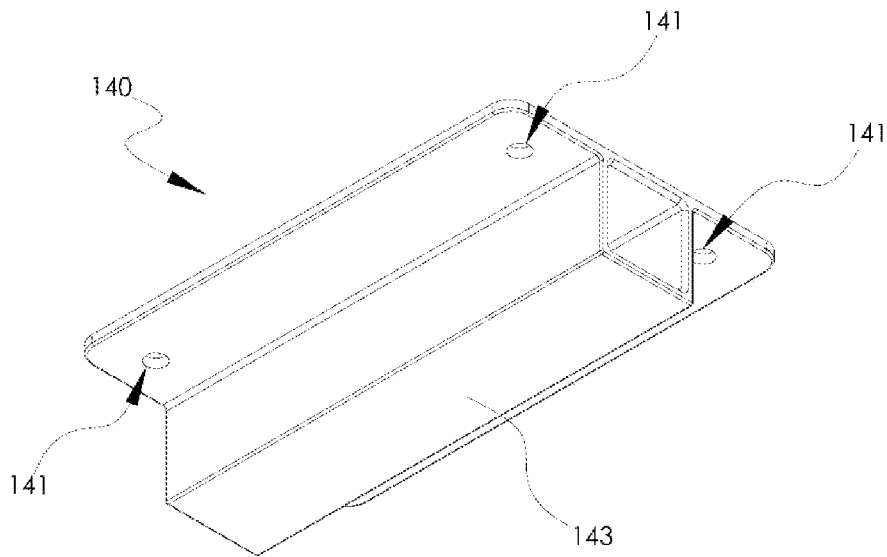


FIG. 10

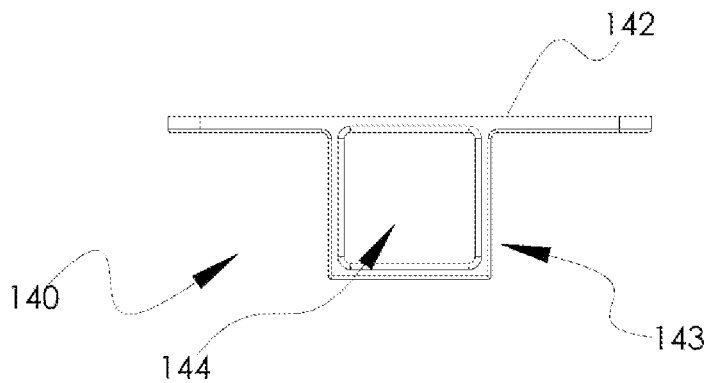


FIG. 11

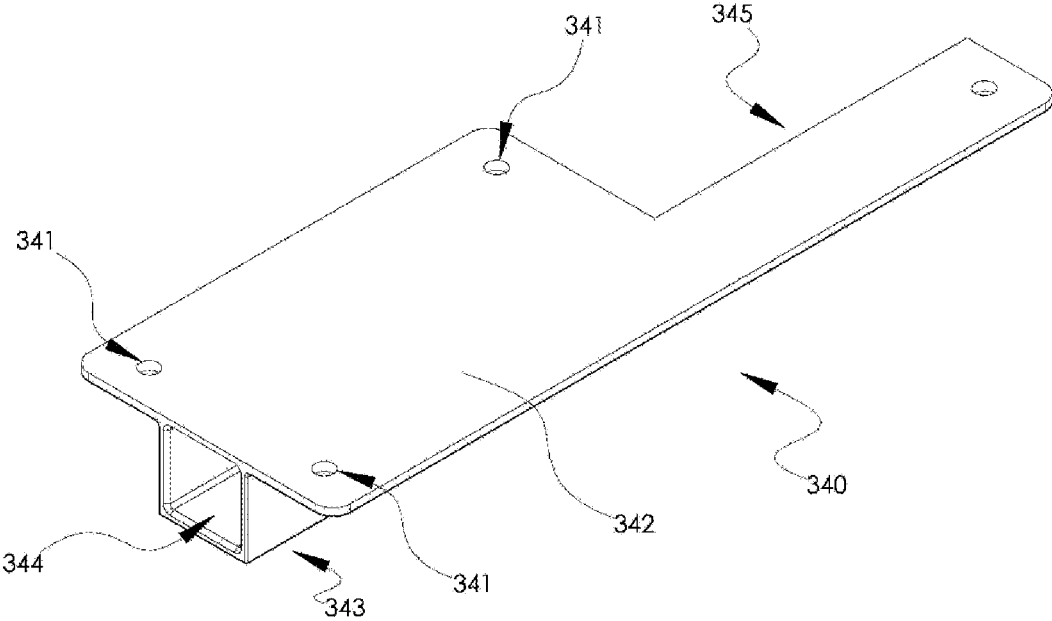


FIG. 12

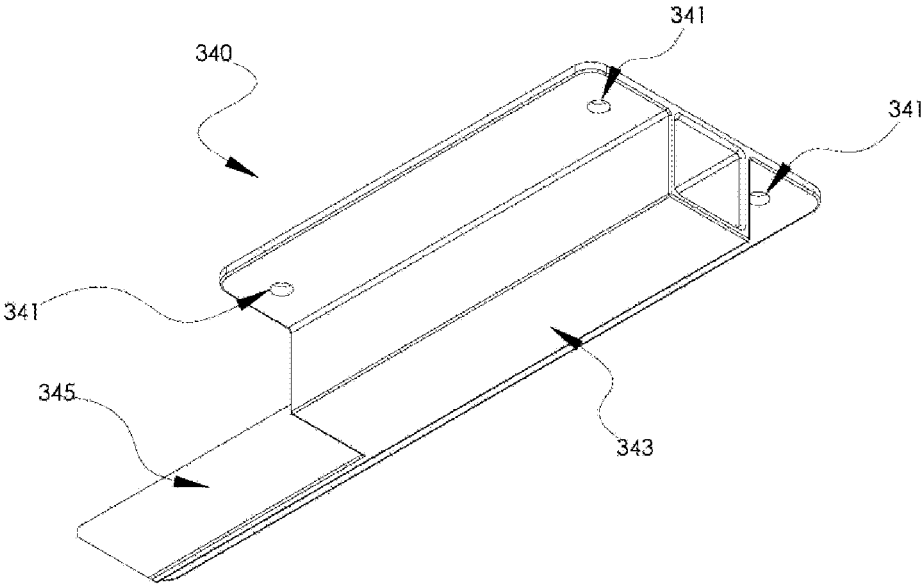


FIG. 13

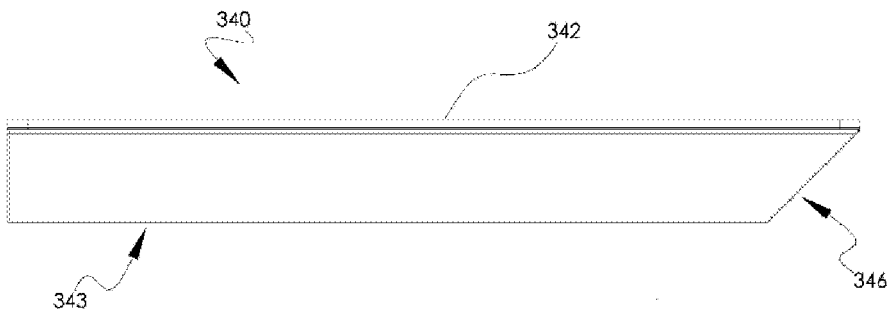


FIG. 14

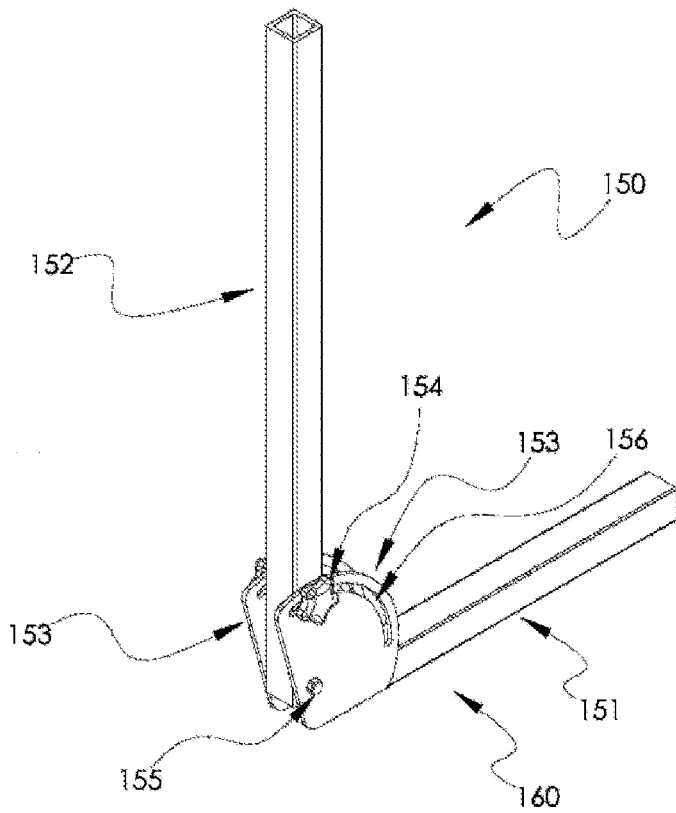


FIG. 15

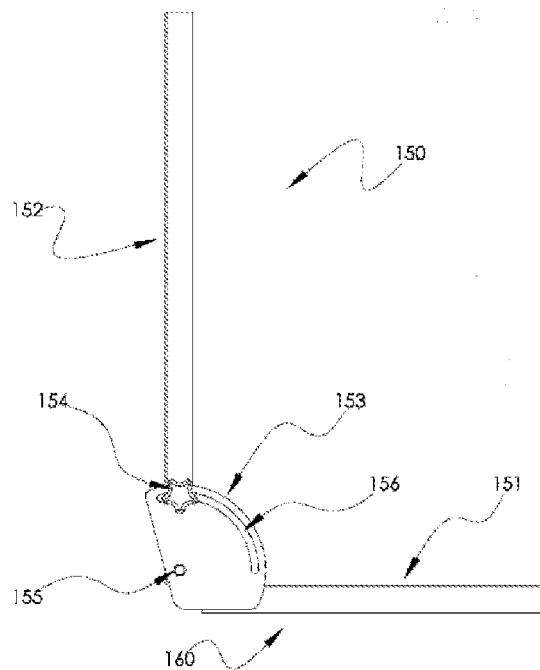


FIG. 16

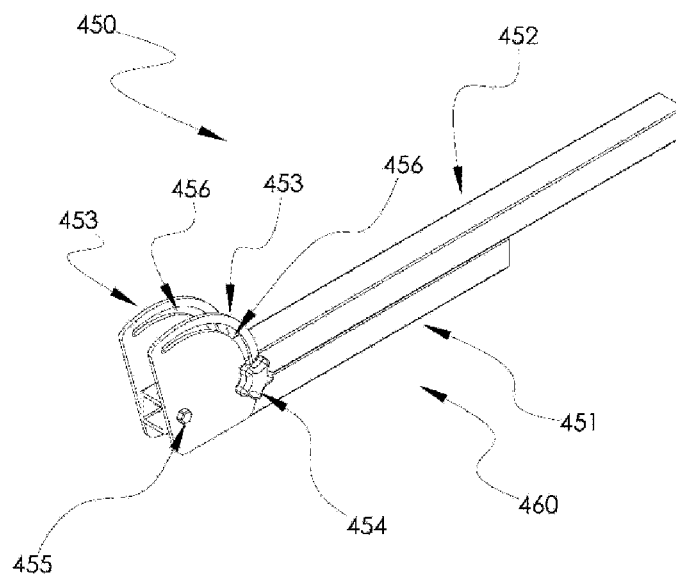


FIG. 17

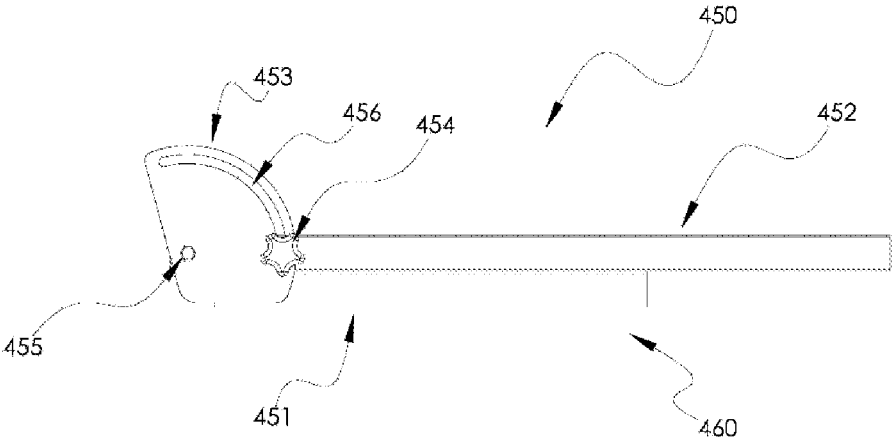


FIG. 18

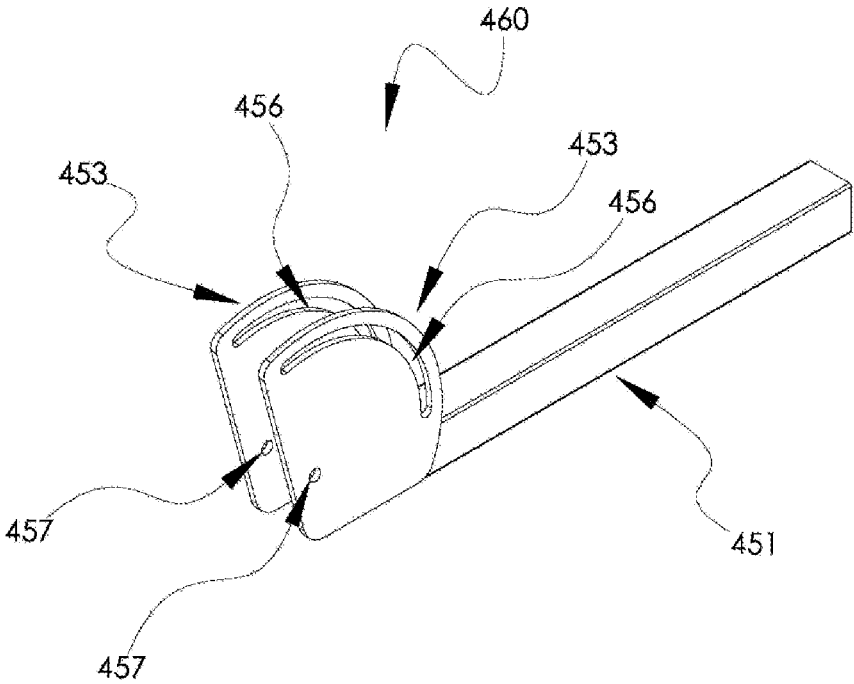


FIG. 19

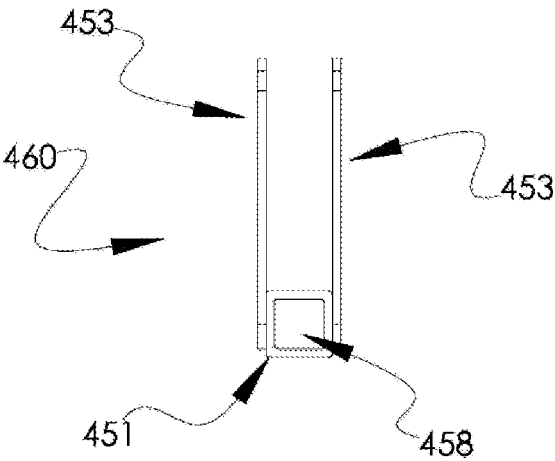


FIG. 20

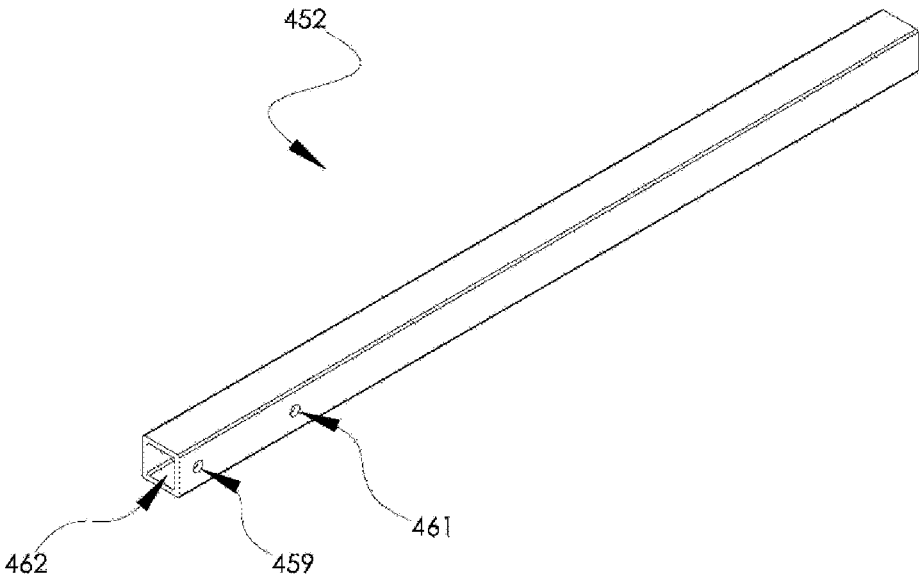


FIG. 21

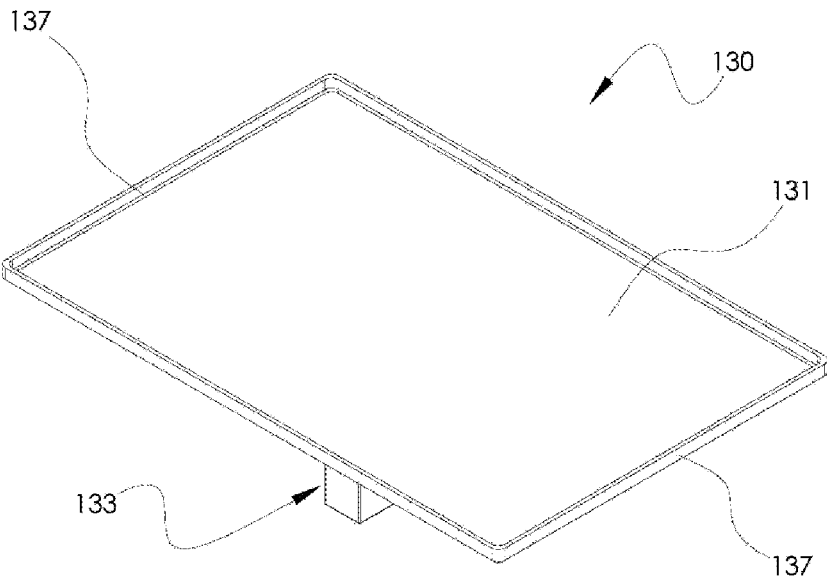


FIG. 22

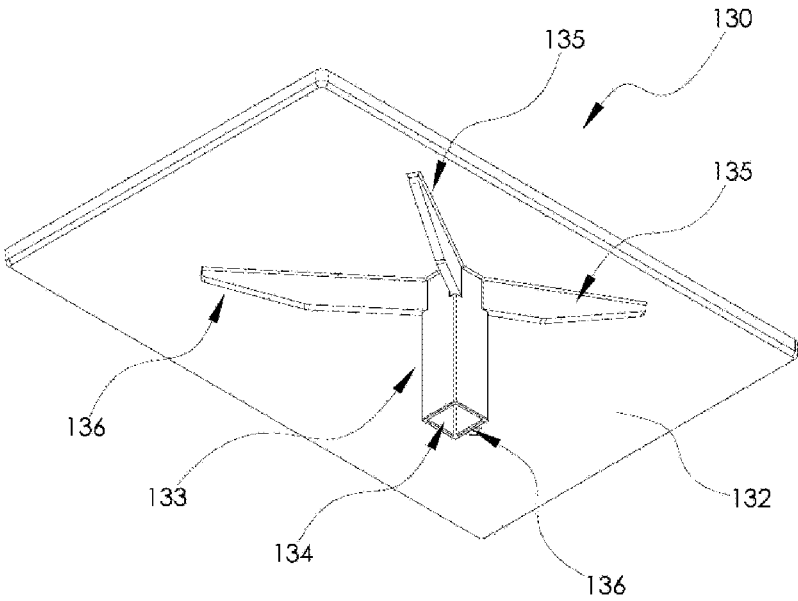


FIG. 23

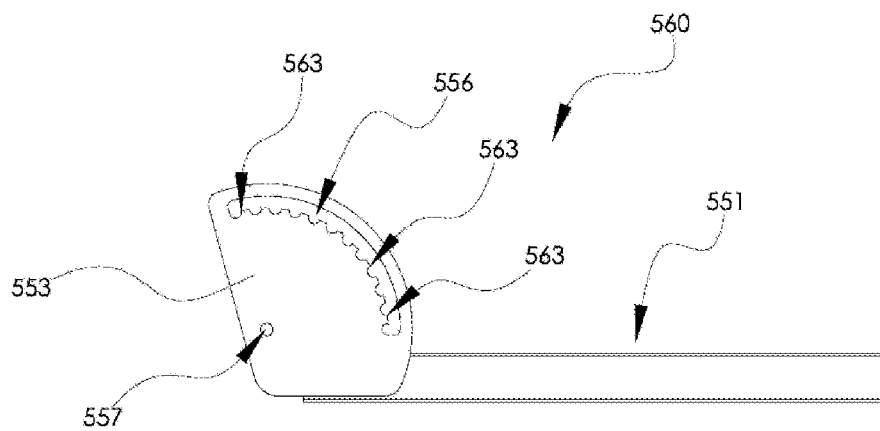


FIG. 24

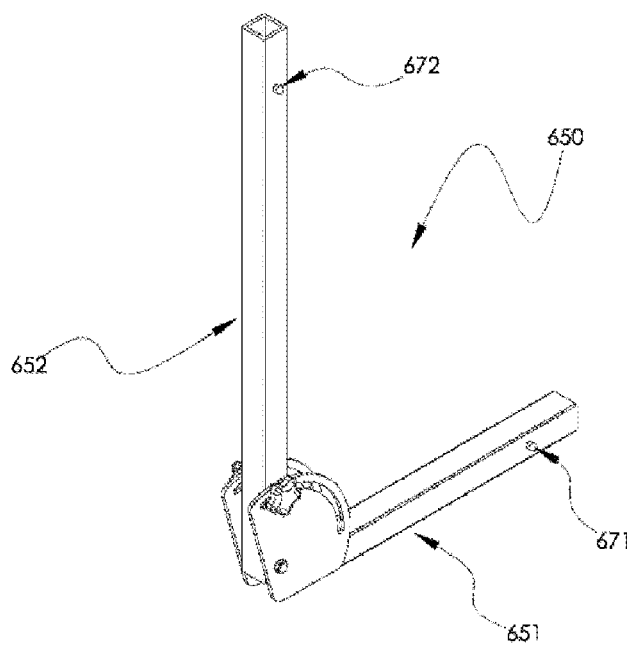


FIG. 25

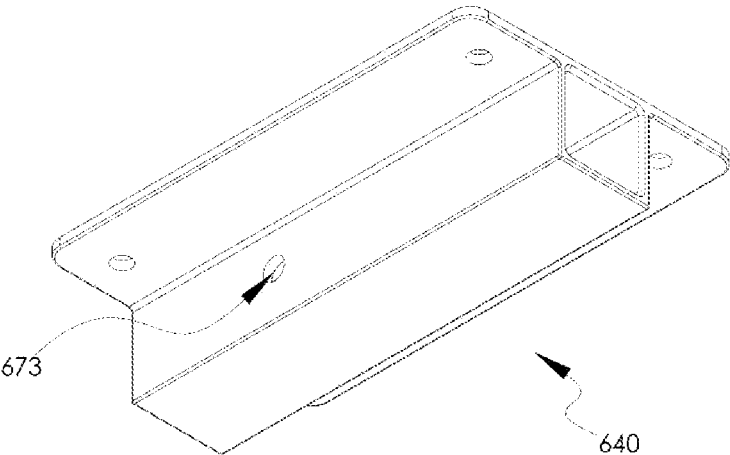


FIG. 26

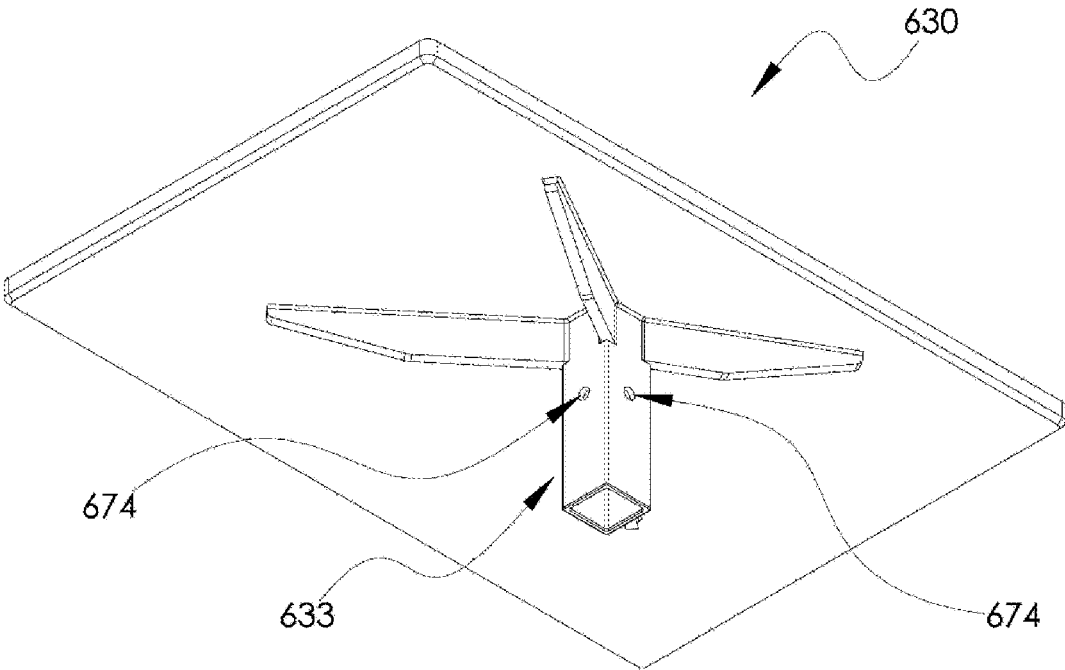


FIG. 27

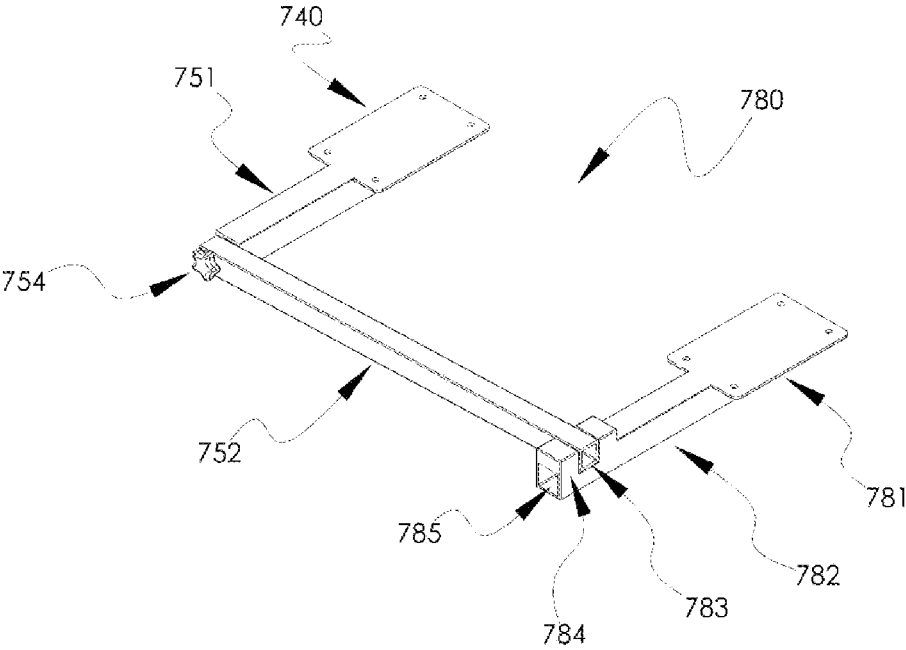


FIG. 28

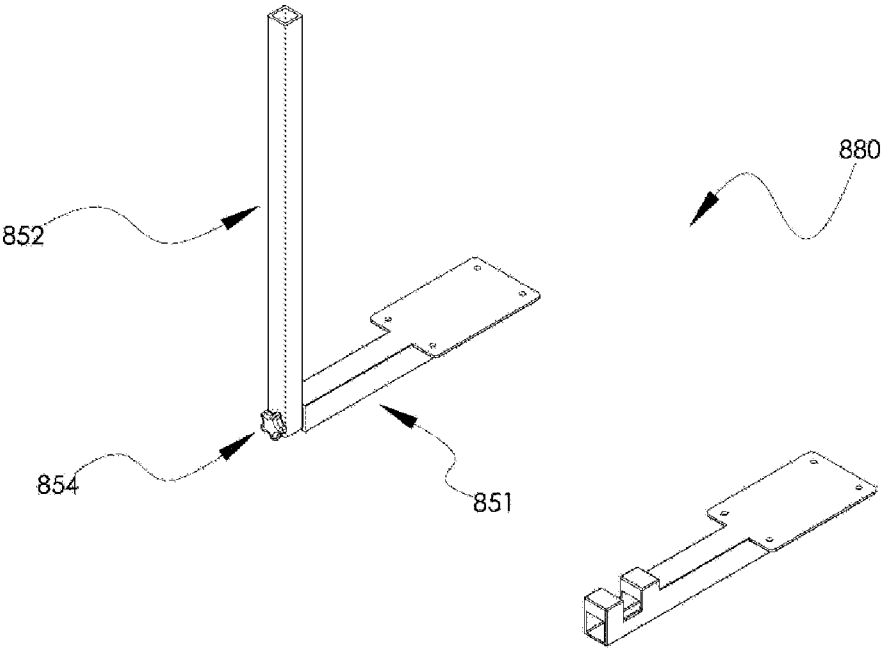


FIG. 29

FOLDABLE PLATFORM AND METHOD OF USE

BACKGROUND

[0001] The present disclosure relates generally to an attachment device and method of use. More particularly, the present disclosure relates to a foldable attachment device for attaching components, such as a table or other platform, to a vehicle, such as a boat, and more specifically such as a pontoon boat, as well as related components and associated methods of use.

[0002] Various types of attachment devices for vehicles, and boats in particular, are known in the art. Some features which may be desirable to attach to a vehicle such as a boat include tables, other platforms, and support features for items including, but not limited to, food, drinks, recreational items, and fishing gear. Boats present particular attachment and storage issues as attachment points and free space for storage tend to be limited, with many, if not all, surfaces already being employed by the design of the boat for functional purposes. Additionally, there tend to be few, if any, flat surfaces for placing items, such as food, drinks, tools, supplies, or recreational items. Pontoon boats, including catamarans and trimarans, are type of boat commonly used for transportation as well as recreational purposes. Pontoon boats are generally intended for carrying supplies, cargo, or multiple individuals over generally calm waters, such as lakes and rivers, as well as for social gatherings and various recreational purposes on the water. For these purposes, every portion of available empty space is generally of value, as to maximize items that may be transported or to maximize room for individuals to stand, rest, or socialize.

[0003] Pontoon boats generally include one or more motors, associated steering mechanisms and equipment, one or more gas tanks, and seating on a generally open and flat platform, though this seating may extend around a majority of the periphery of the platform or may be much more limited, when present. Pontoons boats also often include at least one railing extending at least partially around the periphery of the platform or at the edges of the boat. Pontoon boats sometimes have optional tables, which may be a platform or may include additional connection features, such as cup holders. These tables tend to require permanent or semi-permanent mounting, such as by means of bolting to the floor of the platform. This mounting is cumbersome and is time consuming to perform or remove. Additionally, the placement of such tables and features tends to consume valuable space on the platform of the boat.

[0004] Current tables and support or connection features for vehicles such as pontoon boats, as well as their associated methods of use, face issues of difficulty and time consumption of mounting and removal, when possible. Current tables and support features also face issues with using too much valuable space on a boat as well as being difficult or space-consuming when stored, when storage is even possible.

SUMMARY

[0005] The disclosure relates generally to an attachment device and method of use. More particularly, the present disclosure relates to a foldable attachment device for attaching components, such as a table or other platform, to a vehicle, such as a boat, and more specifically such as a

pontoon boat, as well as related components and associated methods of use. The foldable platform and method of use disclosed herein enable easy and quick attachment, removal, and storage, without requiring the use of valuable space on a boat or other vehicle.

[0006] In one embodiment, the connection device includes a first arm which may include a connection end, a rotational end and may have an axis generally extending between the connection end and the rotational end. The connection device may include a second arm, which may include a connection end, a rotational end, and an axis generally passing between the connection end and the rotational end. The device may include a mounting feature, which may be on one or both of the arms, or may be part of a larger feature or separate component, such as a mounting bracket. The device may also include a rotational feature, such as a pin or other point of rotation, like a joint or pivot. The rotational feature may be part of a separate component, may be part of one of the arms, may be part of an additional component or feature, such as a bracket or brace, or may be part of a larger subassembly which may include other components or elements of the device.

[0007] In one embodiment, the first arm and the second arm may be able to rotate, by means of the rotation feature, from a first relative position to a second relative position. In a further embodiment, an axis passing through the length of the first arm may be substantially parallel to an axis passing through the second arm when the device, or a subassembly of the device, is in a closed configuration. The axis passing through the first arm may be substantially perpendicular, or at least not parallel, to the axis passing through the second arm when the device, or a subassembly of the device, is in an open configuration. The arms of the device may also be configurable to be in one or more intermediate configurations, such as where different relative angles between the axis of the first arm and the axis of the second arm may be desirable.

[0008] The device may be mountable to a vehicle, such as a boat, from a top surface, from a side or otherwise angled surface, or from a bottom surface. In some embodiments, the device may be mounted to the underside of a boat, such as a pontoon boat. In embodiments where the device is mounted to a vehicle by means of a bracket, one or both of the arms may be removably connectable to the bracket.

[0009] The device may include a support component, such as a tabletop, which may have a surface, such as a top surface, which may be at least partially planar, or may include additional connection or mounting features, such as cup holders or holders for fishing equipment, or may have both a planar surface and additional connection features. There may be a mounting feature, such as on the bottom or on a side of the support component. The mounting feature may be a connection point, other connection element or feature, or may extend at least partially away from the main body of the support component. The mounting feature may connect to one or either of the arms of the device through various means, such as an opening configured to receive at least part of one or either of the arms, through a threaded connection feature, or a proud feature which may itself fit into at least a portion of one or either of the arms. The support component may removably connect to one or either of the arms. The support component may also, or alternatively, substantially rigidly connect to one or either of the arms.

[0010] The arms may be connected to each other, directly or indirectly, through an adjustable feature or component, such as through a rotational feature. By means of such adjustment, the first arm and the second arm may be configured between a closed configuration, or a configuration better suited for storage or moving, and an open configuration, such as for use with the support component. The device may include a locking feature to resist motion of the device, or of the arms relative to each other, when set into a desired configuration. The locking feature may be removable, may be lockable and unlockable, and may optionally be a threaded component, such as a locking screw. It may also be a locking pin.

[0011] The device may include a bracing feature or structure, such as to aid in the connection or support of the first arm relative to the second arm, or to house the rotational or other adjustment feature.

[0012] One or both arms of the device may be of various cross-sectional shapes, such as rectangular, and particularly such as substantially square. One or both of the arms may also be substantially hollow, or at least partially hollow.

[0013] The device may be presented as a kit of parts. The kit of parts may include a tabletop component with a tabletop surface and a connection feature, a connector assembly that may include a first arm and a second arm and, optionally, an adjustment feature. The kit may optionally include a mounting bracket, where the mounting bracket may include a mounting surface and may also optionally include an arm connecting element or feature to connect the bracket to one or either of the arms of the connection feature. The bracket, or the connection feature of the kit, may be configured for mounting to the underside of a boat, such as by means of threaded connector components, such as screws or bolts. The bracket may be removably connectable to the boat, to the connection feature, or both. The bracket may be configured to be left connected to the boat or other vehicle while the kit connection feature is removable from the bracket.

[0014] In one method of use of the device, a mounting bracket may be connected to an underside surface of a boat. A connector assembly may be removably connected to the mounting bracket. A tabletop component may be removably connected to the connector assembly. In an optional method of use, the adjustment feature may be locked, such as removably, in a second position, such as a deployed position.

[0015] The disclosure relates to a foldable attachment device for attaching components, such as a table or other platform, to a boat or other vehicle. The associated method may include the use of permanent or removable attachment means, different forms of adjustment and retention in a given configuration, and various additional components. Any number of components or features may be used in conjunction with and incorporated into the attachment device. Various materials, including metals, plastics, and composites, may be used for the described components and features. Components or features of the device may be made entirely or partially out of metal, such as stainless steel, plastics, composites, or may include coatings, such as to resist corrosion.

[0016] It is to be understood that the above mentioned features and the features yet to be explained hereinafter can be used not only in the respectively mentioned combinations but also in other combinations or alone without departing from the context or intent of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention is now disclosed in detail with reference to exemplary embodiments shown in the accompanying drawings, where:

[0018] FIG. 1 shows a front top left isometric view of an embodiment of a foldable platform device of the present disclosure in an environment where it is connected to a pontoon boat;

[0019] FIG. 2 shows a side view of the embodiment of the foldable platform device of FIG. 1 where it is connected to a pontoon boat;

[0020] FIG. 3 shows a front top right isometric view of the embodiment of the foldable platform device of FIG. 1;

[0021] FIG. 4 shows a front bottom left isometric view of the embodiment of the foldable platform device of FIG. 1;

[0022] FIG. 5 shows a right side view of the embodiment of the foldable platform device of FIG. 1;

[0023] FIG. 6 shows a front top right isometric view of an embodiment of a foldable platform device of the present disclosure in a shortened configuration;

[0024] FIG. 7 shows a front bottom left isometric view of the embodiment of the foldable platform device of FIG. 6;

[0025] FIG. 8 shows a right side view of the embodiment of the foldable platform device of FIG. 6;

[0026] FIG. 9 shows a front top right isometric view of an embodiment of a bracket component of the foldable platform device of the present disclosure;

[0027] FIG. 10 shows a front bottom left isometric view of the embodiment of the bracket component of the foldable platform device of FIG. 9;

[0028] FIG. 11 shows a front view of the embodiment of the bracket component of the foldable platform device of FIG. 9;

[0029] FIG. 12 shows a front top right isometric view of an alternate embodiment of a bracket component of the foldable platform device of the present disclosure;

[0030] FIG. 13 shows a front bottom left isometric view of the embodiment of the bracket component of the foldable platform device of FIG. 12;

[0031] FIG. 14 shows a right side view of the embodiment of the bracket component of the foldable platform device of FIG. 12;

[0032] FIG. 15 shows a front top right isometric view of an embodiment of a connector component of the foldable platform device of the present disclosure in an open configuration;

[0033] FIG. 16 shows a right side view of the embodiment of the connector component of the foldable platform device of FIG. 15;

[0034] FIG. 17 shows a front top right isometric view of an embodiment of a connector component of the foldable platform device of the present disclosure in a closed configuration;

[0035] FIG. 18 shows a right side view of the embodiment of the connector component of the foldable platform device of FIG. 17;

[0036] FIG. 19 shows a front top right isometric view of an embodiment of a connector adjustment component of the foldable platform device of the present disclosure;

[0037] FIG. 20 shows a front view of the embodiment of the connector adjustment component of the foldable platform device of FIG. 19;

[0038] FIG. 21 shows a front top right isometric view of an embodiment of a long arm component of the foldable platform device of the present disclosure;

[0039] FIG. 22 shows a front top right isometric view of an embodiment of a tabletop component of the foldable platform device of the present disclosure;

[0040] FIG. 23 shows a front bottom left isometric view of the embodiment of the tabletop component of the foldable platform device of FIG. 22;

[0041] FIG. 24 shows a right side view of an alternate embodiment of a connector adjustment component of the foldable platform device of the present disclosure;

[0042] FIG. 25 shows a front top right isometric view of an alternate embodiment of a connector component of the foldable platform device of the present disclosure in an open configuration;

[0043] FIG. 26 shows a front bottom left isometric view of an alternate embodiment of a bracket component of the foldable platform device of the present disclosure;

[0044] FIG. 27 shows a front bottom left isometric view of an alternate embodiment of a tabletop component of the foldable platform device of the present disclosure;

[0045] FIG. 28 shows a front top right isometric view of an embodiment of a connector assembly of the foldable platform device of the present disclosure in a closed configuration; and

[0046] FIG. 29 shows a front top right isometric view of the embodiment of the connector assembly of the foldable platform device of FIG. 28 in an open configuration.

DETAILED DESCRIPTION

[0047] Exemplary embodiments of the disclosure are illustrated in the Figures and are explained in the following description in more detail, wherein identical reference numbers refer to identical, or similar, or functionally identical or similar components.

[0048] Various aspects of the illustrative embodiments will be described using terms commonly employed by those skilled in the art to convey the substance of their work to others skilled in the art. However, it will be apparent to those skilled in the art that the present invention may be practiced with only some of the described aspects. For purposes of explanation, specific numbers, materials and configurations are set forth in order to provide a thorough understanding of the illustrative embodiments. However, it will be apparent to one skilled in the art that the present invention may be practiced without the specific details. In other instances, well-known features or those previously described are omitted or simplified in order not to obscure the illustrative embodiments.

[0049] Various operations may be described as multiple discrete operations, in turn, in a manner that is most helpful in understanding the present invention, however the order of description should not be construed as to imply that these operations are necessarily order dependent. In particular, these operations need not be performed in the order of presentation. In some instances, structures and devices may be shown in block diagram or flow chart form in order to facilitate describing the disclosed subject matter.

[0050] A foldable platform device 120 is shown in FIGS. 1-5, with FIGS. 1-2 showing the device 120 connected to an exemplary pontoon boat 110, depicting a connected boat and device 100. The device 120 may be mounted to an underside of a boat 110 or to any suitable surface or feature of the boat

110. Though the device 120 is shown mounted on the underside of a surface, such as the underside of a pontoon boat 110, it should be understood that the device 120 may be mounted to the top of a surface, on a side of a surface, or at any suitable angle that may be desirable to a user. In embodiments where the device 120 includes a rotation feature or where the device 120 may be removed from a bracket 140 or otherwise inserted in different orientations relative to the bracket 140, the device 120 may be such that the tabletop 130 is not parallel with the top of the bracket 140. For some uses, it may be preferable to have the bracket 140 mounted to a deck of a boat 110 or other vehicle, or to a side feature of a boat 110 or elements of the boat 110.

[0051] The device 120 may include a tabletop 130, a mounting bracket 140, a connector component or assembly 150, and may further include a short arm 151 and a long arm 152, though it should be understood that some of these components may be unitary, permanently, or removably connected to other components or features, such as where the short arm 151 is welded or otherwise unitary with the connector assembly 150, forming a connector adjustment component 160. The device 120 may also include one or more braces 153 for supporting one of the arms 151, 152 relative to the other arm 151, 152. The device 120 may optionally include a feature 154 for locking the connector assembly 150 in an open or closed configuration, or otherwise resisting having the connector assembly 150 transition out of a desired configuration. In the embodiment shown, the device 120 includes an adjustment screw 154 which may be tightened to lock the connector assembly 150 in either an open or closed configuration, or at desired positions between those two configurations, such as where the device 120 may be mounted to a surface which is not perfectly parallel with the desired orientation of the tabletop 130.

[0052] In the embodiment shown in FIGS. 3-5, the tabletop 130 is connected to the long arm 152 and the short arm 151 is connected to the mounting bracket 140. This allows for keeping the device 120 relatively proximal to the front of the boat 110, while maximizing the height of the tabletop 130 relative to the mounting bracket 140. Either of the short arm 151 or the long arms 152 may be connected to the mounting bracket 140 or the tabletop 130 by various means known in the art, such as by a friction fit, a press-fit, threaded locking rings, threaded connection points, welding, adhesives, or through various locking means, such as spring-loaded locking components. In the embodiment shown, the arms 151, 152 are removably connected to their respective mating components 130, 140. Both of the arms 151, 152 are shown being substantially rectangular in cross-section, such as having been manufactured through the use of formed or extruded metal. It should be understood that other cross-sectional shapes may also be used without deviating from the scope or intent of this disclosure, such as hexagonal, octagonal, triangular, elliptical, and circular. In embodiments where the ends of one or both of the arms 151, 152 are circular in cross-section, threaded connections may be used for one or both of the mounting bracket 140 and the tabletop 130.

[0053] An alternate embodiment of a foldable platform device 220 is shown in FIGS. 6-8. In this embodiment, the device 220 includes a tabletop 130, a mounting bracket 140, a connector assembly 250 which includes a long arm 252 and a connector adjustment component 260 which further includes a short arm 251, connector braces 253, and a

connector locking screw 254. In this embodiment, the short arm 251 is connected to the mounting bracket 140 and the long arm 252 is connected to the tabletop 130. It should be understood that in this embodiment, as well as other embodiments, either of the arms 251, 252 may optionally be unitary or permanently attached to either the tabletop 130 or the mounting bracket 140. In the embodiment shown, the long arm 252 is connected to the mounting bracket 140, giving more distance for the tabletop 130 from the mounting location of the device 220. The short arm 251 is connected to the tabletop 130 in the embodiment shown, resulting in less relative height of the tabletop 130 relative to the mounting bracket 140. As shown in this embodiment, the tabletop 130 is also optionally depicted as connected to the short arm 251 so that the longer side of the tabletop 130 is aligned with the long arm 252. It should be understood that in some embodiments the tabletop 140 may be mounting in different orientations relative to the arm 251, 252 that is connected to the mounting bracket 140, enabling a user to select orientations of the tabletop 140.

[0054] FIGS. 9-11 show an embodiment of the mounting bracket 140. The bracket 140 may include one or more attachment features 141, such as the holes 141 shown. The bracket 140 may be screwed or bolted to the bottom of a boat 110 or other boat, vehicle, surface, or feature, such as through the holes 141. It should be understood that other means of connection may also be used without deviating from the scope or intent of this disclosure, such as welding, snap fits, press-fits, adhesives, and other means known in the art.

[0055] The bracket 140 may include a mounting surface 142. The surface 142 may be substantially planar, as shown, or may include features to aid in or enable retention of the bracket 140 to a desired surface or feature or to resist motion relative to another surface, or may include uneven or proud features, such as ridges to slot against or within a complementary surface or feature or to receive complementary features. The bracket 140 may include one or more openings 144 for at least partially receiving a connection component, such as an arm 351, 351. The bracket 140 may also include a connection feature 143, creating space within the bracket 140 to receive a connection component.

[0056] An alternate embodiment of a bracket 340 is shown in FIGS. 12-14. In this embodiment, the bracket 340 may include screw holes 341, a mounting surface 342, a connector feature 343, and at least one opening 344 to receive an arm 351, 352. The bracket 340 may also optionally include an extension feature 345 to aid in supporting the bracket 340, such as where a connection point or mounting hole 341 is needed further from the front of the bracket 340, while allowing for slotting against a complementary feature of a connection surface, fitting into a restricted space, or otherwise providing additional support. The bracket 340 may optionally include a cutaway surface 346, which may be an angled cut, a chamfer, or other cutaway to provide sufficient support while minimizing space being used or limiting the bracket extending into undesirable locations.

[0057] An embodiment of a connector assembly 150 is shown in FIGS. 15-16. The connector assembly 150 may include a connector adjustment component 160. The connector assembly 150 or the connector adjustment subassembly 160 may further include a short arm 151, a long arm 152, one or more braces 153, a locking feature 154, a connector pivot 155, and one or more adjustment path openings 156.

Though the connector assembly 150 is shown with a long arm 152 and a short arm 151, it should be understood that other lengths or configurations of the arms 151, 152 may also be used without deviating from the scope or intent of this disclosure, such as where both arms 151, 152 are of the same or substantially similar lengths, or where the relative positioning of the long arm 152 and the short arm 151 are reversed. Though both the long arm 152 and the short arm 151 are shown as unitary pieces in this embodiment, it should be understood that either arm 151, 152 or both arms 151, 152 may comprise multiple components, such as two or more arms or extension components which may be permanently or removably connected within each arm 151, 152 or to a bracket 340 or other component. The arms 151, 152 may optionally consist of multiple arms or shafts which may be offset and may be parallel. The arms 151, 152 may also optionally include extension features, such as being telescoping.

[0058] The connector pivot 155 may be any feature suitable to control rotation of the long arm 152 relative to the short arm 151, or vice versa. It may be a substantially cylindrical feature or, as shown, may be a bolt which passes at least partially through the connector assembly 150. There may be one or more adjustment path openings 156. The adjustment path opening 156 may be used to guide a complementary feature during adjustment of the connector assembly 150 between a close configuration and an open configuration, or in intermediate configurations. In the embodiment shown, the adjustment path feature 156 is an opening 156 in one or more braces 153 through which the adjustment screw 154 travels, traveling along with the long arm 152 as it rotates around the pivot 155 relative to the short arm 151. It should be understood that the adjustment path feature 156 may be located on other components, or may not be an opening 156 but may instead be a feature such as a ridge along which a complementary feature travels during rotation. It should also be understood that either the long arm 152 or the short arm 151 may travel along the adjustment path feature 156. In this embodiment, the connector assembly 150 is shown in an open configuration.

[0059] A connector assembly 450 in a closed configuration is shown in FIGS. 17-18. This connector assembly 450 also includes a connector adjustment component 460. The connector assembly 450 or the connector adjustment subassembly 460 may also further include a short arm 451, a long arm 452, one or more braces 453, a locking feature 454, a connector pivot 455, and one or more adjustment path openings 456. The connector assembly 450 may be placed into a closed configuration to take up less space or two reduce the likelihood of undesirable contact with the connector assembly 450 when not in use. In some methods of use, the connector assembly 450 may be stored in a closed configuration, then opened and attached to a bracket 140 or a tabletop 130, or may be attached in a closed configuration and then opened. It should be understood that, though the long arm 452 is shown resting against the short arm 451, with rotational features such as the braces 453 and pivot 455 connected to the short arm 451, the optional braces 453 and/or pivot 455 may be connected to the long arm 452, with the short arm 451 performing the relative rotation, without deviating from the scope or intent of this disclosure.

[0060] An embodiment of a connector adjustment component 460 is shown in FIGS. 19-20. The adjustment component 460 may include an arm 451, one or more braces 453,

one or more adjustment path openings 456, a pivot opening 457, and an option at least partial opening 458 in the arm 451. In embodiments where the arm 451 is extruded, it may be desirable to have the arm 451 at least partially hollow, both to minimize weight and to enable easier manufacture. In the embodiment shown, the braces 452 include at least one opening 457 for a pivot to be inserted, such as a cylinder, bolt, or screw. However, the pivot may be unitary with either a brace 453 or the arm 451, such as passing through the hollow 458 of the arm 451 where the arm is partially cutaway. In embodiments where the arm 451 is partially cutaway, exposing the hollow 458, no braces 453 may be necessary. The one or more braces 453 may, when present, be connected to the arm 451 in any of various ways known in the art, such as welding, or may be unitary with the arm 451. The braces 453 may include one or more holes 457 for insertion of a pivot, a pivot may be inserted between the braces 453 prior to attachment to the arm 451, or the pivot may be unitary with one or more of the braces 453.

[0061] An exemplary long arm 452 is shown in FIG. 21. It should be understood that the features described herein regarding the long arm 452 may optionally apply to the short arm 451. In this embodiment, the arm 452 includes a hollow space 462, a pivot opening 459, and an adjustment screw opening 461. Both the pivot opening 459 and the adjustment screw opening 461 may pass entirely through the arm 452 or at least partially into the arm 452.

[0062] FIGS. 22-23 show an embodiment of a tabletop 130 for the foldable device 120. The tabletop 130 may include a substantially flat surface 131, an optional rim 137 at least partially surrounding the top surface 131, a bottom surface 132, a mounting feature 133, and an optional hollow space 134 in the mounting feature 133. In embodiments where the mounting feature 133 is welded to the bottom surface 132, or otherwise connected to it, the mounting feature 133 may include an at least partial hollow space 134 to reduce weight or to improve manufacturability. The mounting feature 133 may also include the hollow space 134 to receive either a long arm 152 or a short arm 151, though in other embodiments the mounting feature 133 may fit into the long arm 152 or the short arm 151, or the tabletop 130 may connect to the long arm 152 or the short arm 151 through other means.

[0063] The tabletop 130 may optionally include one or more ribs 135, 136. These ribs 135, 136 may aid in providing structural support for the bottom surface 132, such as for scenarios where heavy loads may be placed on the tabletop 130. These ribs 135, 136 may also or alternatively provide support for the mounting feature 133 or the long arm 152 or short arm 151 when connected to the tabletop. In the embodiment shown, there are two small ribs 135 and two large ribs 136, with either pairing of ribs 135, 136 being set at different angles relative to an axis passing through the length of the tabletop 130, though it should be understood that other numbers of ribs, other combinations of sizes, or identical sizes, and other angles of the ribs 135, 136 may also be used. The tabletop 130 is shown as rectangular, though it should be understood that other shapes may also be used, such as square, pentagonal, hexagonal, octagonal, triangular, and circular, as well as hybrid shapes, including ones where there is at least one cut into or concavity in the tabletop 130. It should also be understood that, though the tabletop 130 is shown as substantially planar at the top surface 131, there may be recesses in it, proud features, it

may be at least partially concave, at least partially convex, and may include additional features, such as cup holders or attachment features for fishing gear. Though the mounting feature 133 is shown as off-center relative to the bottom surface 132 in this embodiment, other embodiments may have the mounting feature 133 centered, closer to an edge, or otherwise located.

[0064] FIG. 24 shows an alternate embodiment of the connector adjustment component 560. In this embodiment, the adjustment component 560 includes an arm 551, one or more braces 553, a pivot opening 557, and at least one adjustment path opening 556. The component 560 further optionally includes a plurality of teeth 563 to aid in retaining an adjustment screw 154 in a desired location. Other means of location adjustment may also be used without deviating from the scope or intent of this disclosure, such as external or internal teeth on the braces 553 or arm 551, ratcheting mechanisms, and other means known in the art.

[0065] An alternate connector 650, alternate bracket 640, and alternate tabletop 630, are shown in FIGS. 25, 26, and 27, respectively. In the embodiments shown the connector 650, bracket 640, and tabletop 630, connect by means of spring-loaded buttons 671, 672 and associated openings 673, 674 or divots, with openings 673, 674 shown, though other means of connection, such as snap fits or other connections by means of plastic or elastic deformation may also be used. The connector 650 may include a short arm 651 which may further include at least one connector button 671. The connector 650 may also include a long arm 652 which may also include at least one connector button 672. The bracket 640 may include at least one complementary opening 673 or divot for receiving a button 671, 672. The tabletop 630 may include at least one complementary opening 674 or divot for receiving a button 671, 672. In the embodiment shown, the mounting feature 633 of the tabletop 630 includes at least one opening 674 on one side of the mounting feature 633 and a second opening 674 90 degrees from that surface of the mounting feature 633, allowing connection of an arm 651, 652 in different orientations relative to the tabletop 630. It should be understood that the connection features 671, 672, though shown on the arms 651, 652, may alternatively be located on either or both of the tabletop 630 and the mounting bracket 640.

[0066] An alternative embodiment of a connector 780, 880 is shown in FIGS. 28-29. In this embodiment, the connector 780 may be permanently, semi-permanently, or removably connected to a mounting structure or vehicle, such as a boat 110. The connector 780 may be kept in a stored configuration when not in use. The connector 780 may be at least partially hidden when in a stored configuration, or may be at least partially exposed or otherwise accessible. The connector 780 may be used for other purposes when in a stored configuration, such as useable as a partial ladder, step, hand-hold, or connection or mounting feature.

[0067] The connector 780 is shown in a stored configuration in FIG. 28, wherein the connector 780 may include a bracket 740, a short arm 751, a long arm 751, a locking screw 754, a support bracket 781, and a support arm 782. The bracket 740 and the short arm 751 may be separate components or, as shown, may be unitary. The support bracket 781 and the support arm 782 may be separate components or may be unitary, as shown. When in a closed configuration, the long arm 752 may rest against the support arm 782 or may rest at least partially within a recess 783 in

the support arm 782. The support arm 782 may further optionally include at least partial sides 784 at least partially surrounding the recess 783. The support arm 782 may also optionally include one or more at least partial openings 785. As shown, the support arm 782 includes a hollow opening 785 passing through the length of the support arm 782, enabling less weight, easier manufacture, and improved drainage of water.

[0068] Though the long arm 751 of the connector 780 is shown in this embodiment as resting at least partially within a recess 783 of the support arm 782 when the connector 780 is in a closed or stowed configuration, it should be understood that the long arm 751 may rest against only a partially supported feature of the support arm 782 and not within a recess 783, the long arm 751 may rest on the support arm 782 itself, or may rest merely near to the support arm 782, such as in front of the support arm 782. In another embodiment, which is not shown, the long arm 751 may be lockable to the support arm 782, such as by means of a separate locking screw 754 or other locking feature. In one embodiment and associated method of use, the locking screw 754 may connect the long arm 751 to the support arm 782. A user may then remove the locking screw 754, which may alternately be a locking pin, rotate the long arm 752 into a deployed position, and then lock the long arm 752 in that deployed position by means of a locking screw 754 or locking pin.

[0069] As shown in FIG. 29, the connector 880 may be opened into a deployed configuration, such as through a method where a locking screw 854 may be loosened, the long arm 852 may be rotated up or into a deployed orientation relative to the short arm 851, and then the locking screw 854 or other locking feature may be tightened, re-tightened, or otherwise configured to resist motion, aiding in retaining the connector 880 in a deployed configuration.

[0070] While the present invention has been related in terms of the foregoing embodiments, those skilled in the art will recognize that the invention is not limited to the embodiments described. The present invention can be practiced with modification and alteration within the spirit and scope of the appended claims. Thus, the description is to be regarded as illustrative instead of restrictive on the present invention. Accordingly, various modifications, adaptations, combinations, and alternatives may occur to one skilled in the art without departing from the spirit of the invention and scope of the claimed coverage.

What is claimed is:

1. A connection device, comprising:

- a first extension member, comprising a first connection end, a first rotational end, and defining a first axis extending between the first connection end and the first rotational end;
- a second extension member, comprising a second connection end, a second rotational end, and defining a second axis extending between the second connection end and the second rotational end;
- a mounting feature; and
- a rotational feature;

wherein the rotational feature enables rotation of the second extension member relative to the first extension member such that the first axis and the second axis are reversibly adjustable between a first configuration wherein the first axis and the second axis are substan-

tially parallel and a second configuration wherein the first axis and the second axis are substantially perpendicular.

2. The connection device according to claim 1, further wherein the connection device further comprises a mounting bracket, wherein the mounting bracket comprises the mounting feature.

3. The connection device according to claim 1, further wherein the mounting feature is configured to be connectable to an underside surface of a boat by means of at least one threaded mounting component.

4. The connection device according to claim 2, further wherein the mounting bracket further comprises a first connection feature configured to removably substantially rigidly connect to the first connection end.

5. The connection device according to claim 1, further comprising a support component.

6. The connection device according to claim 5, further wherein the support component comprises a first support surface, a first mounting surface, and a first mounting feature extending away from the first mounting surface relative to the first support surface, defining a third axis extending from the first support surface through the first mounting feature.

7. The connection device according to claim 6, further wherein the first support surface is at least partially planar.

8. The connection device according to claim 7, further wherein the first mounting feature further comprises a second connection feature configured to substantially rigidly connect to the second connection end.

9. The connection device according to claim 7, further wherein the first mounting feature further comprises a second connection feature configured to removably connect to the second connection end.

10. The connection device according to claim 9, further comprising a connector subassembly, wherein the connector subassembly further comprises the first extension member, the second extension member, and a rotational feature.

11. The connection device according to claim 10, further wherein the connector subassembly comprises at least one locking feature configured to removably lock the connection device in the second configuration.

12. The connection device according to claim 11, further wherein the at least one locking feature is a threaded component.

13. The connection device according to claim 10, further wherein the connector subassembly further comprises at least one bracing feature connected to the first extension member.

14. The connection device according to claim 10, further wherein at least one of the first extension member and the second extension member is substantially rectangular in cross-section relative to the first axis or the second axis, respectively.

15. The connection device according to claim 10, further wherein at least one of the first extension member and the second extension member is at least partially hollow.

16. A kit of parts, comprising:

- a tabletop component that further comprises a first tabletop surface, a second tabletop surface, and a first tabletop connection feature; and
- a connector assembly that further comprises a first arm with a first connection end, a second arm with a second connection end, and a first adjustment feature;

wherein the first connection end is configured to be rigidly connectable to the first tabletop connection feature and the connector assembly is configured to be adjustable between a first undeployed configuration and a first deployed configuration by means of the first adjustment feature.

17. The kit of parts according to claim **16**, further comprising a mounting bracket, wherein the mounting bracket further comprises a first mounting surface and a first bracket connection feature, further wherein the second connection end is configured to be rigidly connectable to the first bracket connection feature.

18. The kit of parts according to claim **17**, further wherein the mounting bracket is configured to be mountable to the underside of a boat by means of threaded connector components, and the second connection end is configured to be removable from the first bracket connection feature without removing the mounting bracket from the boat.

19. A method of using a connection device, comprising:
attaching a mounting bracket to an underside surface of a boat;

removably attaching a connector assembly to the mounting bracket; and

removably attaching a tabletop component to the connector assembly;

wherein the connector assembly comprises a first arm and a second arm, the mounting bracket comprises a first connection feature configured to receive a first end of a first arm of the connector assembly, the tabletop component comprises a second connection feature configured to receive a second end of a second arm of the connector assembly, and the connector assembly comprises an adjustment feature configured to enable relocation of the first arm relative to the second arm between at a first relative position along a first rotational axis passing through the connector assembly and a second relative position along the first rotation axis passing through the connector assembly.

20. The method of using a connection device according to claim **19**, further comprising removably locking the adjustment feature in the second relative position.

* * * * *