US 20110014829A1

(19) **United States**

(12) **Patent Application Publication**

Burke

(10) **Pub. No.: US 2011/0014829 A1**

(43) **Pub. Date: Jan. 20, 2011**

(54) **MOTOR MOUNT ASSEMBLY**

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(21) Appl. No.: **12/836,579**

(22) Filed: **Jul. 15, 2010**

Related U.S. Application Data

(60) Provisional application No. 61/225,562, filed on Jul. 15, 2009.

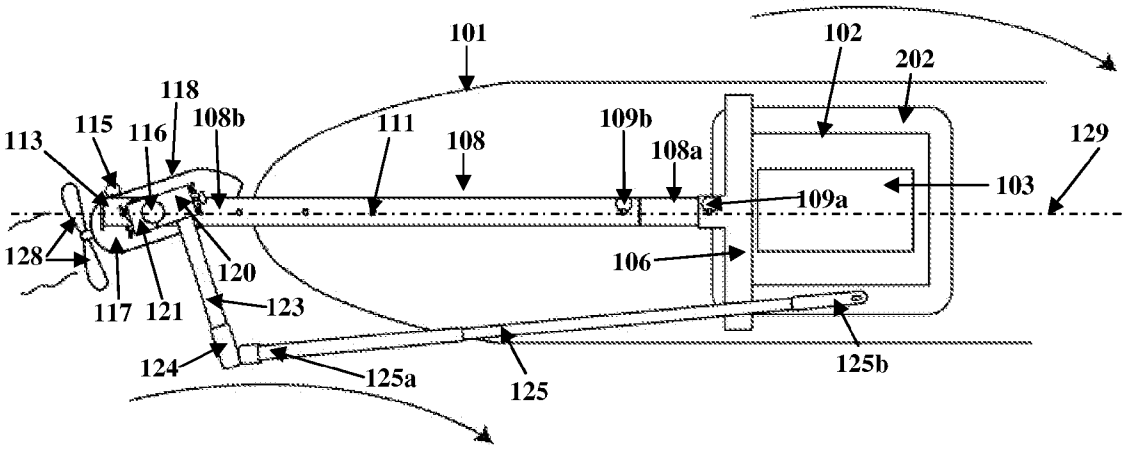
Publication Classification

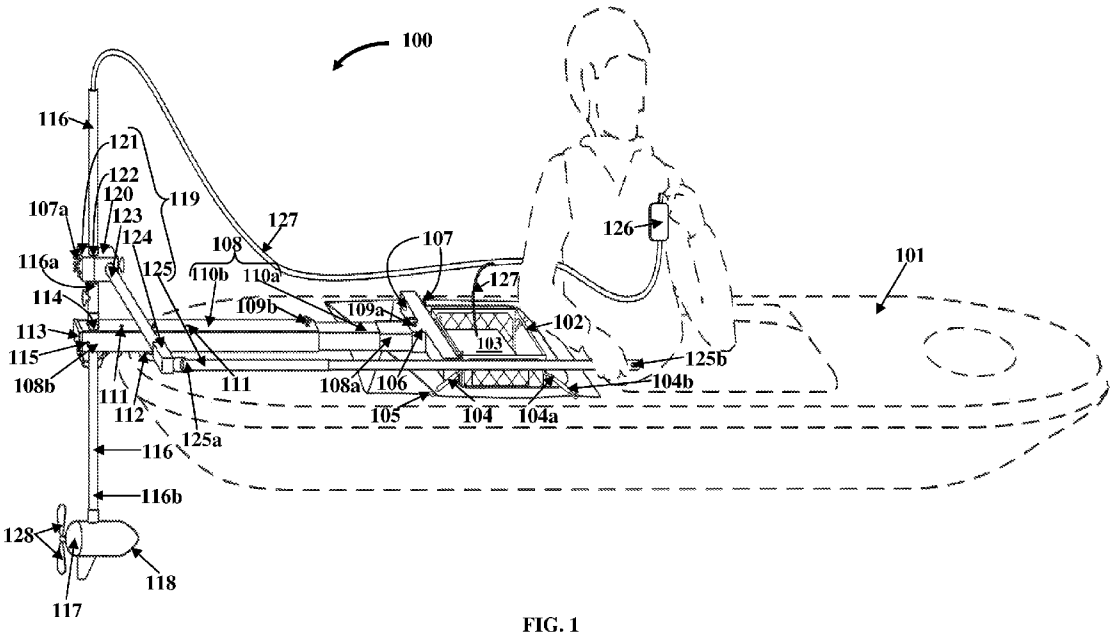
(51) **Int. Cl.**
B63H 20/08 (2006.01)
B63H 21/17 (2006.01)

(52) **U.S. Cl.** **440/6**; 440/53; 440/63

(57) **ABSTRACT**

A motor mount assembly is provided for detachably attaching a motor to a watercraft. The motor mount assembly comprises a battery housing, a mounting flange, an adjustable support assembly, and a motor support shaft. The battery housing is disposed on and releasably secured to the watercraft. The battery housing accommodates a battery that powers the motor. The mounting flange is detachably attached to and extends outwardly from the battery housing. A first end of the adjustable support assembly detachably attaches to the mounting flange. The adjustable support assembly supports the motor support shaft. The motor support shaft is connected to a second end of the adjustable support assembly and is positioned substantially vertical to the adjustable support assembly. The motor is connected to the bottom end of the motor support shaft and is therefore detachably attached to the watercraft via the motor support shaft.




100
116
121
122
120
119
107a
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124
127
108
107
116a
125
110b
110a
126
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109b
109a
127
113
102
103
115
125b
108b
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108a
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104b
112
105
104
104a
125a
116
116b
128
118
117

FIG. 1

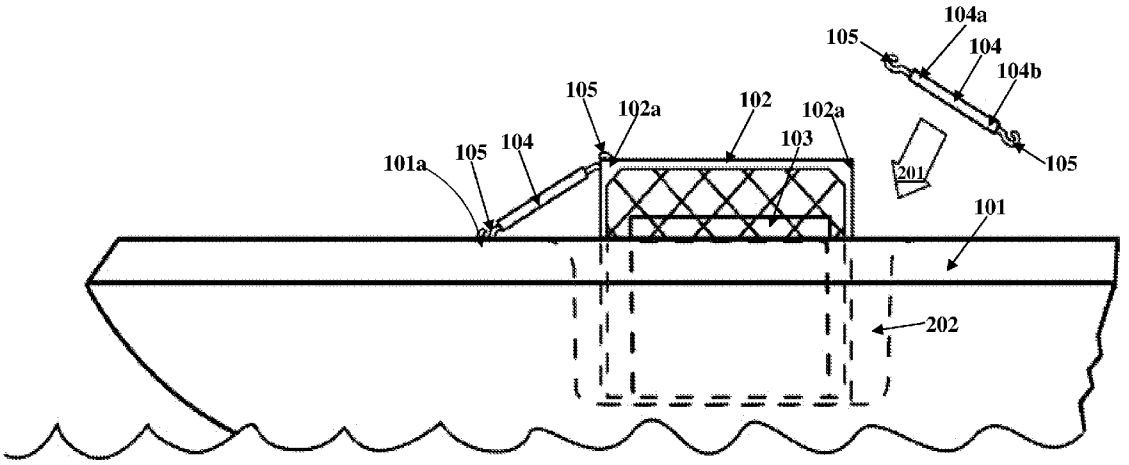
104a
105
104
104b
105
105
102a
102
102a
103
104
101a
105
201
105
101
202

FIG. 2

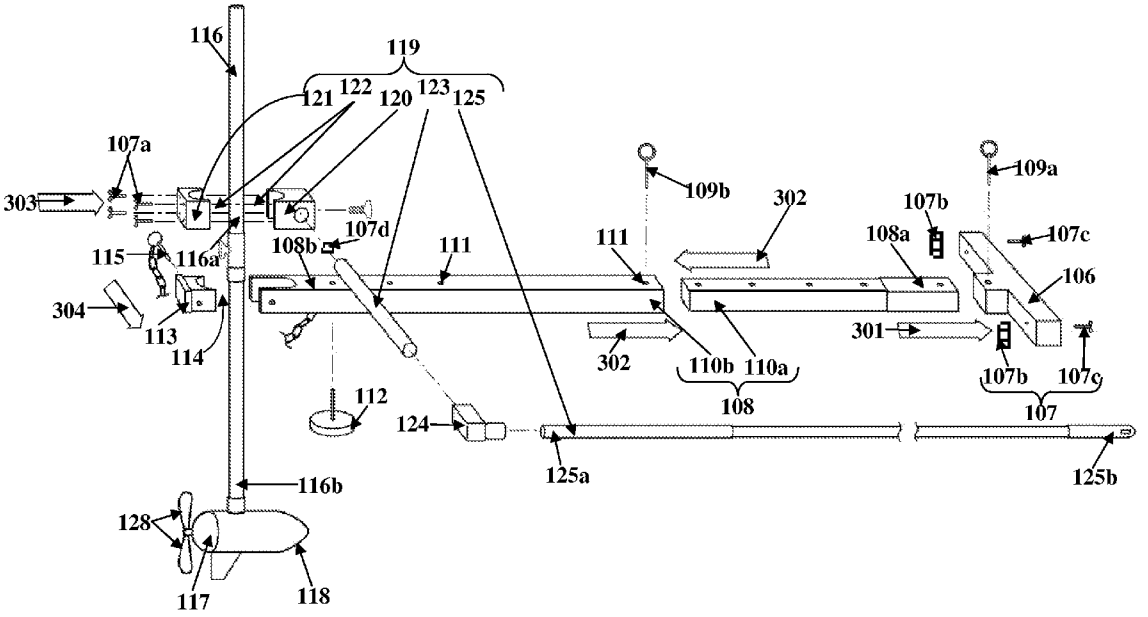
116
119
121
122
120
123
125
107a
303
109b
302
107b
109a
107d
108b
111
111
108a
107c
115
116a
106
304
113
114
302
301
110b
110a
107b
107c
112
108
107
124
125a
125b
116b
128
117
118

FIG. 3

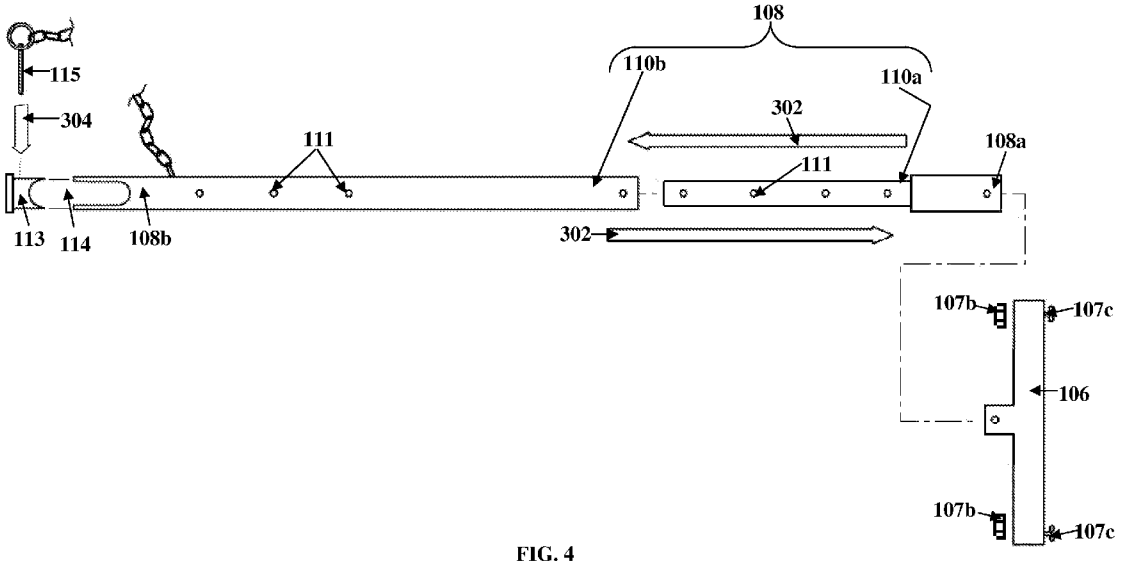
108
110b
110a
115
304
302
111
108a
111
113
114
108b
302
107b
107c
106
107b
107c

FIG. 4

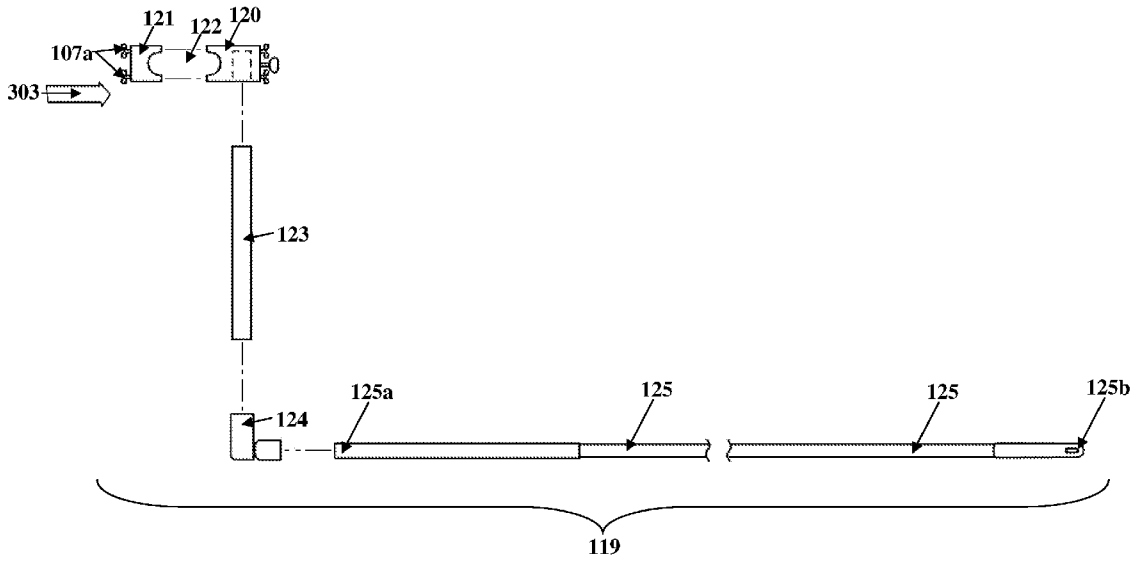

FIG. 5

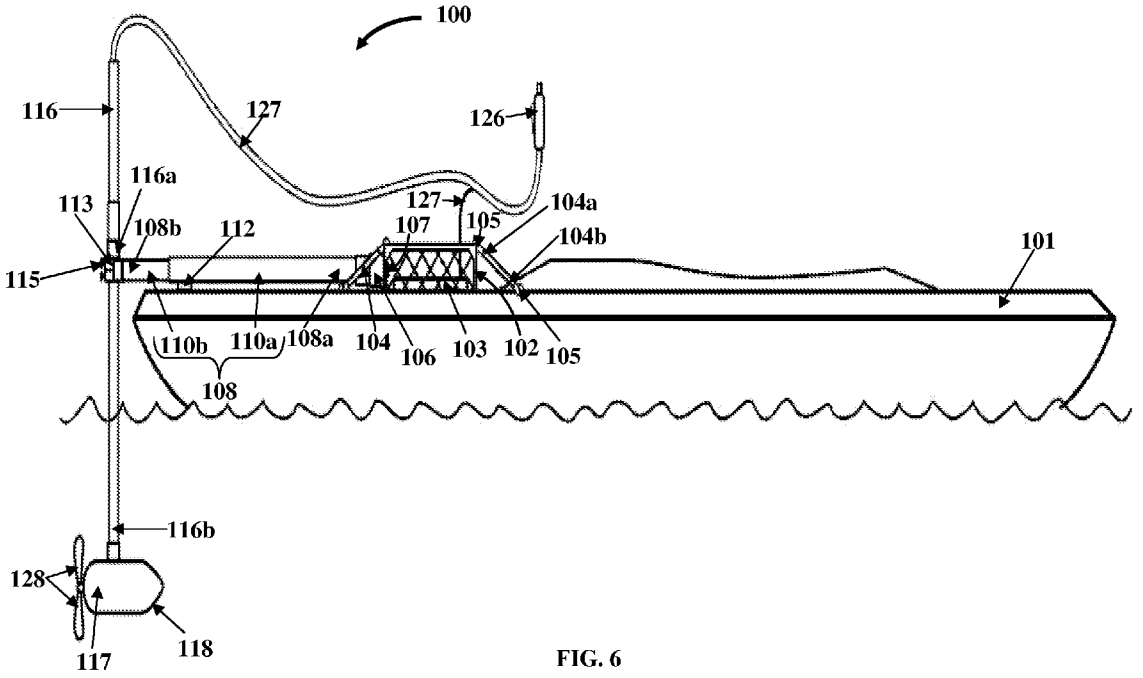
100
116
127
126
116a
113
127
104a
108b
112
107
105
104b
101
115
110b
110a
108a
104
106
103
102
105
108
116b
128
117
118

FIG. 6

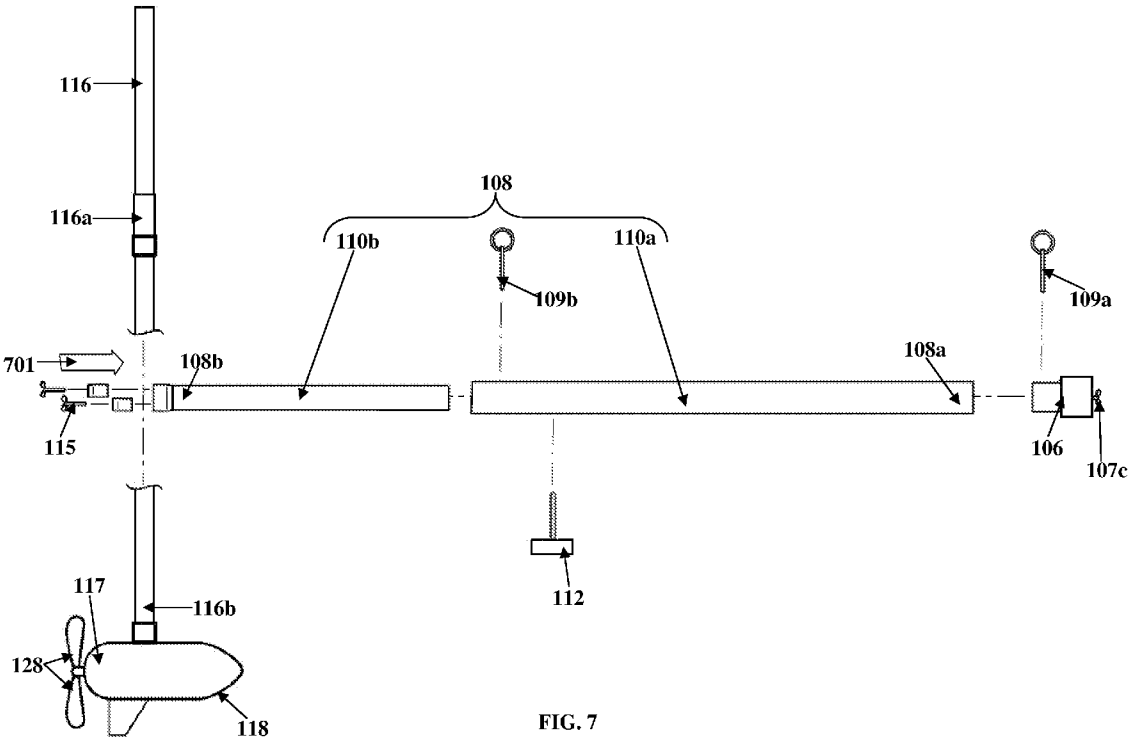
116
116a
108
110b
110a
109b
109a
701
108b
108a
115
106
107c
112
117
116b
128
118

FIG. 7

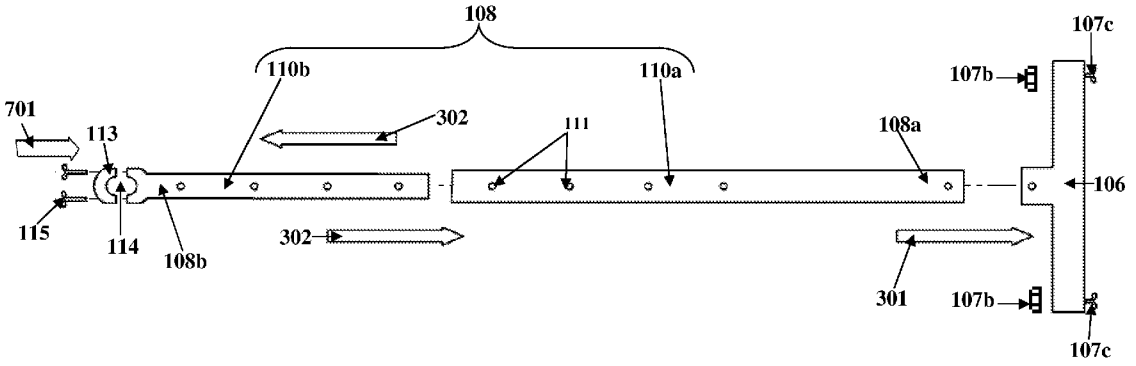
108
107c
110b
110a
107b
701
302
111
108a
113
106
115
114
108b
302
301
107b
107c

FIG. 8

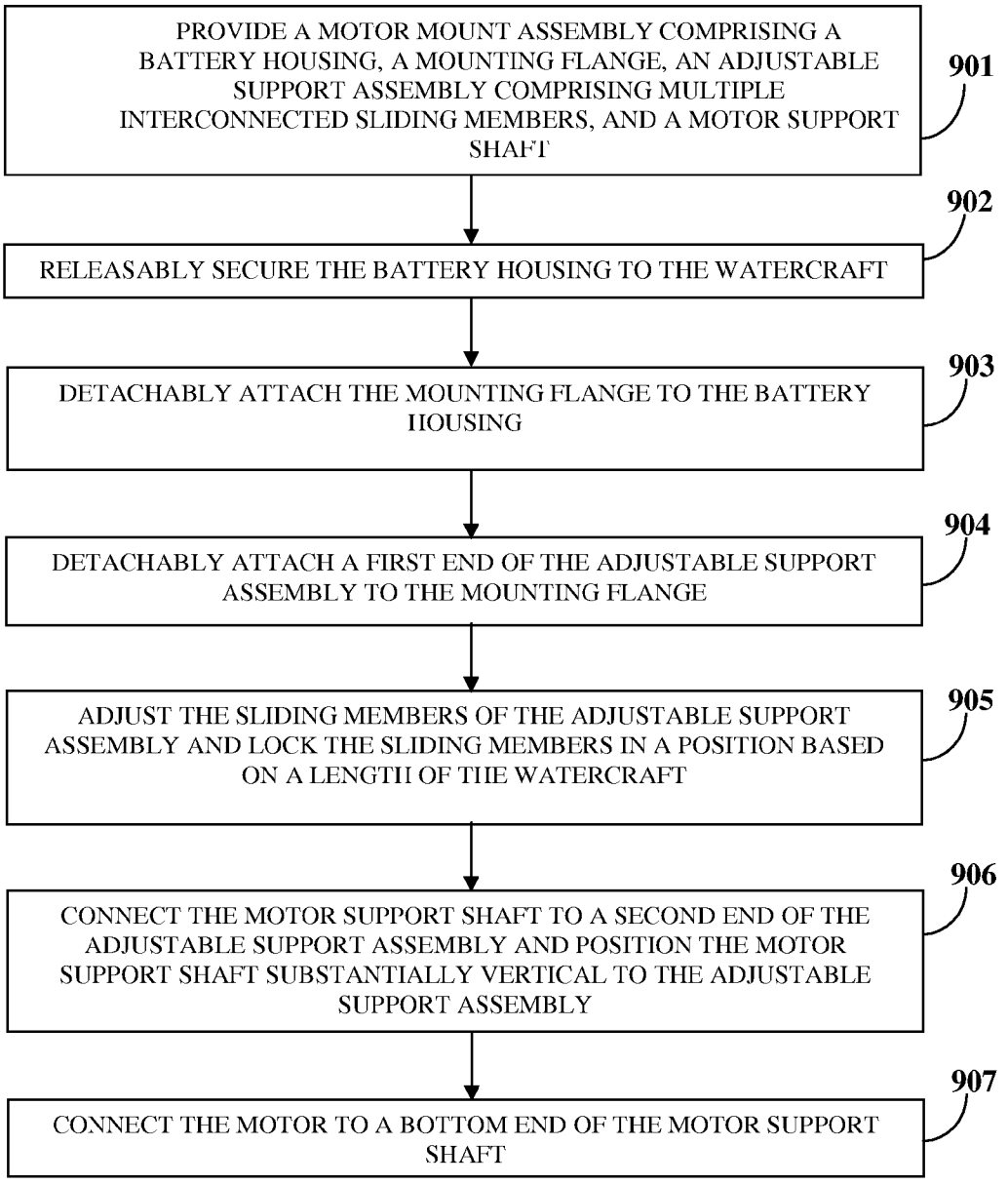
PROVIDE A MOTOR MOUNT ASSEMBLY COMPRISING A BATTERY HOUSING, A MOUNTING FLANGE, AN ADJUSTABLE SUPPORT ASSEMBLY COMPRISING MULTIPLE INTERCONNECTED SLIDING MEMBERS, AND A MOTOR SUPPORT SHAFT
901
RELEASABLY SECURE THE BATTERY HOUSING TO THE WATERCRAFT
902
DETACHABLY ATTACH THE MOUNTING FLANGE TO THE BATTERY HOUSING
903
DETACHABLY ATTACH A FIRST END OF THE ADJUSTABLE SUPPORT ASSEMBLY TO THE MOUNTING FLANGE
904
ADJUST THE SLIDING MEMBERS OF THE ADJUSTABLE SUPPORT ASSEMBLY AND LOCK THE SLIDING MEMBERS IN A POSITION BASED ON A LENGTH OF THE WATERCRAFT
905
CONNECT THE MOTOR SUPPORT SHAFT TO A SECOND END OF THE ADJUSTABLE SUPPORT ASSEMBLY AND POSITION THE MOTOR SUPPORT SHAFT SUBSTANTIALLY VERTICAL TO THE ADJUSTABLE SUPPORT ASSEMBLY
906
CONNECT THE MOTOR TO A BOTTOM END OF THE MOTOR SUPPORT SHAFT
907

FIG. 9

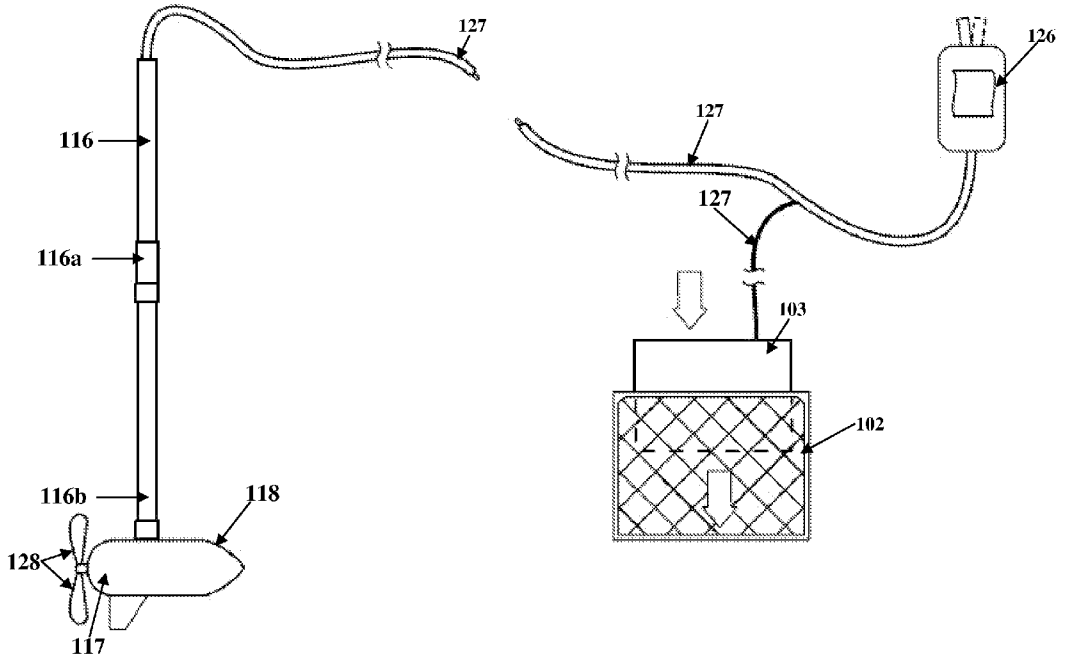

FIG. 10

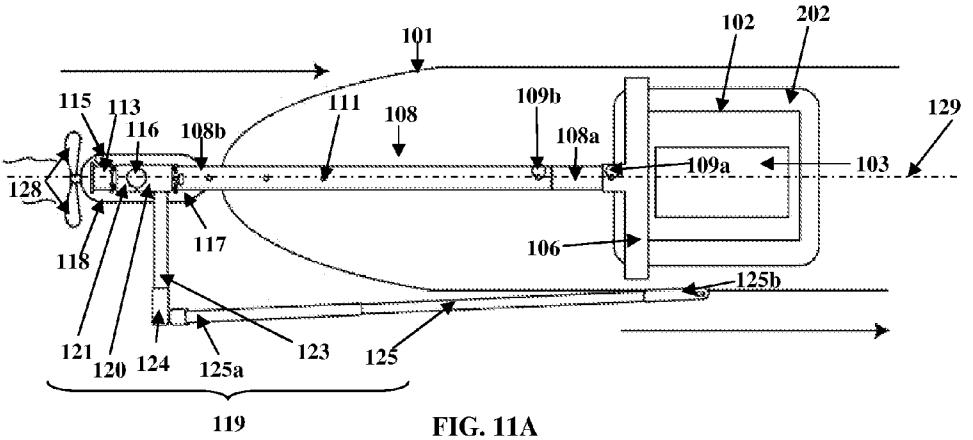

FIG. 11A

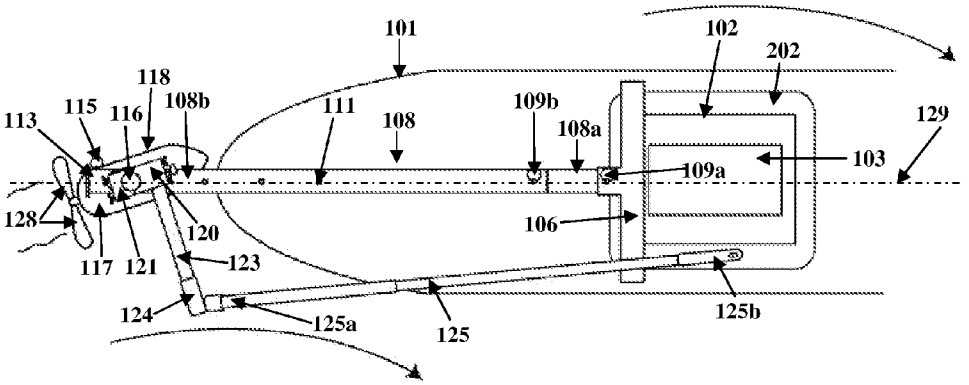

FIG. 11B

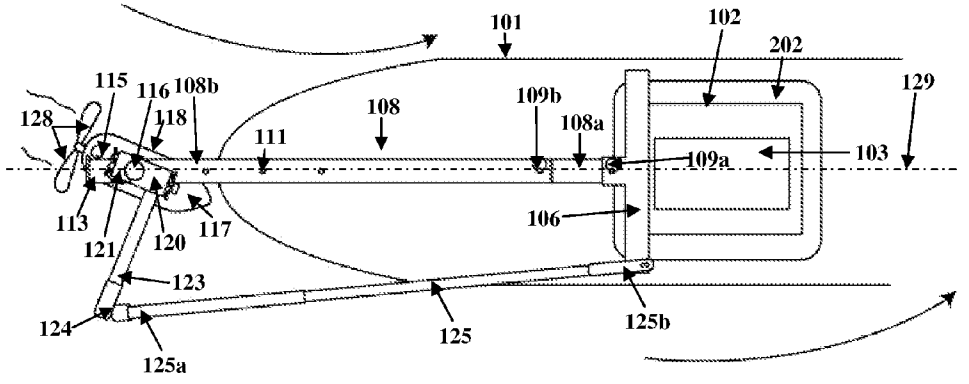

FIG. 11C

MOTOR MOUNT ASSEMBLY

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of provisional patent application No. 61/225562 titled "Motor Mount Assembly", filed on Jul. 15, 2009 in the United States Patent and Trademark Office.

[0002] The specification of the above referenced application is incorporated herein by reference in its entirety.

BACKGROUND

[0003] Conventional watercrafts are manually powered by paddlers using oars or other paddling devices. The paddlers generally get exhausted while manually paddling the watercrafts. Also, when a group of paddlers manually powers a watercraft by paddling, some of the paddlers are unable to keep up with the group because of exhaustion, age, physical conditions, etc. The paddlers may also be afraid to venture far into the sea or other water body, for fear of being too fatigued to return. Many others are unable to engage in this form of recreation due to physical disabilities.

[0004] To propel a watercraft using minimal effort, an electrically powered watercraft is required. In order to electrically power a watercraft with an electric motor with a steering facility and associated control components, there is a need for a mounting assembly that accommodates and firmly supports an electrical power source, the electric motor, the steering facility, and its associated components on the watercraft. Furthermore, there is a need for a mounting assembly that is stable, lightweight in construction, and easy to assemble on or attach to the watercraft.

[0005] Hence, there is a long felt but unresolved need for a detachable motor mount assembly that enables a user or paddler to attach an electrically powered motor to the watercraft and propel the watercraft using the electrically powered motor.

SUMMARY OF THE INVENTION

[0006] This summary is provided to introduce a selection of concepts in a simplified form that are further described in the detailed description of the invention. This summary is not intended to identify key or essential inventive concepts of the claimed subject matter, nor is it intended for determining the scope of the claimed subject matter.

[0007] The motor mount assembly disclosed herein addresses the above stated need for detachably attaching an electrically powered motor to a watercraft for propelling the watercraft. The motor mount assembly disclosed herein comprises a battery housing, a mounting flange, an adjustable support assembly, and a motor support shaft. The battery housing is disposed on and releasably secured to the watercraft. In an embodiment, the motor mount assembly further comprises clamping elements for releasably securing the battery housing to the watercraft. The battery housing is configured to accommodate a battery that powers the motor.

[0008] The mounting flange is detachably attached to the battery housing within the watercraft and enables mounting of the adjustable support assembly on the mounting flange. The mounting flange extends outwardly from the battery housing within the watercraft. In an embodiment, the mounting flange is a T-shaped frame detachably attached to the battery housing by multiple fastening elements.

[0009] A first end of the adjustable support assembly is detachably attached to the mounting flange, for example, by a locking pin. A second end of the adjustable support assembly supports the motor support shaft. In an embodiment, the adjustable support assembly comprises multiple interconnected sliding members adjustable for varying lengths of the watercraft. Each of the sliding members of the adjustable support assembly comprises multiple recesses for receiving one or more locking pins. The locking pins lock the sliding members to each other in a position based on length of the watercraft. In an embodiment, the motor mount assembly further comprises a footpad connected to the adjustable support assembly and positioned between the adjustable support assembly and the watercraft for supportively cushioning the adjustable support assembly on the watercraft.

[0010] The motor support shaft is connected to the second end of the adjustable support assembly and positioned substantially vertical to the adjustable support assembly. The second end of the adjustable support assembly is configured to receive the motor support shaft. The motor mount assembly further comprises an end cap configured to receive and secure the motor support shaft within a space defined between the second end of the adjustable support assembly and the end cap. In an embodiment, the motor mount assembly further comprises a locking element for locking the motor support shaft within the space defined by the second end of the adjustable support assembly and the end cap for a pivotal connection or a rigid connection of the motor support shaft to the adjustable support assembly. In an embodiment, the motor support shaft is pivotally connected to the adjustable support assembly for steering the watercraft. In another embodiment, the motor support shaft is rigidly connected to the adjustable support assembly for non-steering of the watercraft.

[0011] The motor is connected to the bottom end of the motor support shaft. The motor is, for example, a permanent magnet direct current motor. In an embodiment, the motor mount assembly further comprises a casing for accommodating the motor. The casing with the accommodated motor is connected to the bottom end of the motor support shaft. The motor is therefore detachably attached to the watercraft via the motor support shaft.

[0012] In another embodiment, the motor mount assembly further comprises a steering system rigidly attached to a middle section of the motor support shaft. The steering system comprises a steering mount bracket with an end cap, a tie rod, and a steering handle. The steering mount bracket with the end cap is rigidly attached to the middle section of the motor support shaft. The steering mount bracket and the end cap together define a space for receiving the middle section of the motor support shaft. The tie rod is rigidly attached to the steering mount bracket and provides a lateral offset for applying a steering force by a user on the motor support shaft. The steering handle is hingedly connected to the tie rod. A first end of the steering handle is hingedly connected to the tie rod. A second end of the steering handle is disposed proximal to the user to enable the user to apply the steering force on the motor support shaft.

[0013] In the motor mount assembly disclosed herein, the battery accommodated in the battery housing is in electric communication with the motor connected to the motor support shaft for electrically powering the motor. In another embodiment, the motor mount assembly further comprises a control system disposed proximal to the user within the watercraft. The control system is in electric communication

with the accommodated battery and the motor for controlling discharge of the electrical power from the accommodated battery to the motor during operation of the motor. The control system enables the user to change speed and direction of rotation of the motor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The foregoing summary, as well as the following detailed description of the invention, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, exemplary constructions of the invention are shown in the drawings. However, the invention is not limited to the specific components and methods disclosed herein.

[0015] FIG. **1** exemplarily illustrates a perspective view of a motor mount assembly for detachably attaching a motor to a watercraft.

[0016] FIG. **2** exemplarily illustrates a battery housing of the motor mount assembly releasably secured to the watercraft.

[0017] FIG. **3** exemplarily illustrates an exploded view of the motor mount assembly with a steering system.

[0018] FIG. **4** exemplarily illustrates a top exploded view of a steering embodiment of the motor mount assembly.

[0019] FIG. **5** exemplarily illustrates a top view of a steering system of the motor mount assembly.

[0020] FIG. **6** exemplarily illustrates a side view of a non-steering embodiment of the motor mount assembly on a watercraft.

[0021] FIGS. **7-8** exemplarily illustrate exploded views of a non-steering embodiment of the motor mount assembly.

[0022] FIG. **9** illustrates a method for detachably attaching a motor to a watercraft.

[0023] FIG. **10** exemplarily illustrates a control system of the motor mount assembly in electric communication with a battery and a motor.

[0024] FIGS. **11A-11C** exemplarily illustrate steering movement of the watercraft using the steering system of the motor mount assembly.

DETAILED DESCRIPTION OF THE INVENTION

[0025] FIG. **1** exemplarily illustrates a perspective view of a motor mount assembly **100** for detachably attaching a motor **117** to a watercraft **101**. As used herein, the "watercraft" is a water surface transportation vessel, for example, a canoe, a kayak, a boat, etc. used for transporting materials or persons over water. The motor mount assembly **100** disclosed herein comprises a battery housing **102**, a mounting flange **106**, an adjustable support assembly **108**, and a motor support shaft **116**. The battery housing **102** is disposed on and is releasably secured to the watercraft **101**. The battery housing **102** is configured to accommodate a battery **103** that powers the motor **117**. The mounting flange **106** is detachably attached to the battery housing **102** within the watercraft **101** and enables mounting of the adjustable support assembly **108** to the mounting flange **106**. The mounting flange **106** extends outwardly from the battery housing **102** within the watercraft **101**. A first end **108***a* of the adjustable support assembly **108** detachably attaches to the mounting flange **106**, for example, by a locking pin **109***a*. A second end **108***b* of the adjustable support assembly **108** supports the motor support shaft **116**. The motor support shaft **116** is connected to the second end **108***b* of the adjustable support assembly **108** and is positioned substantially vertical to the adjustable support assembly **108**.

[0026] A bottom end **116***b* of the motor support shaft **116** is connected to the motor **117**. The motor **117** is an electric trolling motor. The motor **117** is, for example, a permanent magnet direct current motor. In an embodiment, the motor mount assembly **100** disclosed herein further comprises a casing **118** for accommodating the motor **117**. The casing **118** with the accommodated motor **117** is connected to the bottom end **116***b* of the motor support shaft **116**. The motor **117** is therefore detachably attached to the watercraft **101** by the motor mount assembly **100**. A propeller **128** is connected to the motor **117** for propelling the watercraft **101**. The electrically powered motor **117** drives the propeller **128** for propelling the watercraft **101**.

[0027] The adjustable support assembly **108** is, for example, made of a thermoplastic polymer. In an embodiment, the adjustable support assembly **108** comprises multiple interconnected sliding members **110***a* and **110***b* adjustable for varying lengths of the watercraft **101**. The sliding members **110***a* and **110***b* are adjusted and locked in a position based on the length of the watercraft **101**. Each of the sliding members **110***a* and **110***b* of the adjustable support assembly **108** comprises multiple recesses **111** for receiving one or more locking pins **109***b*. The locking pins **109***b* lock the sliding members **110***a* and **110***b* to each other in a position based on the length of the watercraft **101**.

[0028] In another embodiment, the motor mount assembly **100** disclosed herein further comprises a steering system **119** rigidly attached to a middle section **116***a* of the motor support shaft **116**. The steering system **119** comprising a steering mount bracket **120** with an end cap **121**, a tie rod **123**, and a steering handle **125** is disclosed in the detailed description of FIG. **5**.

[0029] In the motor mount assembly **100** disclosed herein, the battery **103** accommodated in the battery housing **102** is in electric communication with the motor **117** connected to the motor support shaft **116**, for electrically powering the motor **117**. In an embodiment, the motor mount assembly **100** disclosed herein further comprises a control system **126** in electric communication with the accommodated battery **103** and the motor **117** via, for example, wires **127** for controlling discharge of electrical power from the accommodated battery **103** to the motor **117** during operation of the motor **117**. The control system **126** is disposed proximal to the user within the watercraft **101** and enables the user to change speed and direction of rotation of the motor **117**. The control system **126** is, for example, a portable handheld device. The handheld control system **126** enables the user to maneuver the motor **117** remotely. In an embodiment, the control system **126** may also be foot operated by the user. The motor mount assembly **100** disclosed herein is removable from the watercraft **101** for easy transport and storage.

[0030] FIG. **2** exemplarily illustrates a battery housing **102** of the motor mount assembly **100** releasably secured to the watercraft **101**. In an embodiment, the motor mount assembly **100** disclosed herein further comprises multiple clamping elements **104** to releasably secure the battery housing **102** to the watercraft **101** in an enclosure **202** predesigned on the watercraft **101**. The predesigned enclosure **202** in the watercraft **101** accommodates the battery housing **102**. In an embodiment, the clamping elements **104** are, for example, tension springs that are extendible under tension. Opposing ends **104***a* and **104***b* of each of the clamping elements **104**

comprise, for example, hooks **105** that are used to releasably secure the battery housing **102** to the watercraft **101**. The battery housing **102** comprises prefabricated recesses **102***a* for receiving the hooks **105** on one of the opposing ends **104***a* of the clamping elements **104**. Each of the hooks **105** on the other opposing ends **104***b* of the clamping elements **104** may be inserted into protruding recesses **101***a* on the watercraft **101** for detachably attaching the battery housing **102** to the watercraft **101**. The clamping elements **104** are directed to detachably attach the battery housing **102** to the watercraft **101** as exemplarily illustrated by the arrow **201** in FIG. **2**. In an example, four clamping elements **104** may be provided for four corners of a square shaped battery housing **102** to releasably secure the battery housing **102** to the watercraft **101**. These clamping elements **104** may extend under tension and secure the battery housing **102** to the watercraft **101**. When the battery housing **102** needs to be released from the watercraft **101**, the user removes the hooks **105** of each of the clamping elements **104** from the corresponding protruding recesses **101***a* of the watercraft **101** and from the corresponding prefabricated recesses **102***a* on the battery housing **102**, and releases the battery housing **102** from the watercraft **101**.

[0031] The battery **103** accommodated in the battery housing **102** is, for example, a lightweight rechargeable battery that enables selective utilization of power for maneuvering of the watercraft **101**. The battery **103** is, for example, a sealed lead-acid (SLA) battery or any other portable power source. The battery **103** easily fits inside the battery housing **102**, produces low noise or no noise during operation of the watercraft **101**, and is environment friendly as no air polluting by-products are released during the operation of the watercraft **101**.

[0032] FIG. **3** exemplarily illustrates an exploded view of the motor mount assembly **100** with a steering system **119**. In the exploded view illustrated in FIG. **3**, the motor mount assembly **100** disclosed herein comprises the mounting flange **106**, the adjustable support assembly **108**, the motor support shaft **116**, and the steering system **119**. In an embodiment, the mounting flange **106** is a T-shaped frame detachably attached to the battery housing **102** by multiple fastening elements **107**. The mounting flange **106** extends outwardly from the battery housing **102** as exemplarily illustrated in FIG. **1**. The fastening elements **107** are, for example, threaded bolts **107***c* and nuts **107***b* that enable the user to fasten the mounting flange **106** to the battery housing **102**. In order to fasten the mounting flange **106** to the battery housing **102**, the user inserts the bolts **107***c* and nuts **107***b* into the abutting mounting flange **106** and the battery housing **102** and rotates the bolts **107***c* against the corresponding nuts **107***b*.

[0033] In an embodiment, the first end **108***a* of the adjustable support assembly **108** is detachably attached to the mounting flange **106** by a locking pin **109***a*. The direction of detachably attaching the first end **108***a* of the adjustable support assembly **108** to the mounting flange **106** is exemplarily illustrated by the arrow **301**. In an embodiment, the adjustable support assembly **108** comprises multiple interconnected sliding members **110***a* and **110***b* adjustable for varying lengths of the watercraft **101** as exemplarily illustrated in FIGS. **1** and **3**. Each of the sliding members **110***a* and **110***b* of the adjustable support assembly **108** is configured to slide into one another in directions as exemplarily illustrated by the arrows **302**. In an embodiment, the interconnected sliding members **110***a* and **110***b* are arranged in a telescopic arrangement and extended for varying lengths of the watercraft **101**. The sliding members **110***a* and **110***b* are, for example, of a square cross section, a rectangular cross section, a circular cross section, an oval cross section, etc. Each of the sliding members **110***a* and **110***b* comprises multiple recesses **111** for receiving one or more locking pins **109***b*. The locking pins **109***b* lock the sliding members **110***a* and **110***b* to each other in a position based on length of the watercraft **101**. In this embodiment, the motor mount assembly **100** disclosed herein further comprises a footpad **112** connected to the adjustable support assembly **108** and positioned between the adjustable support assembly **108** and the watercraft **101** for supportively cushioning the adjustable support assembly **108** on the watercraft **101**. The footpad **112** is, for example, of a rubber cup shape. Furthermore, a fastening element **107***d*, for example, a wing nut may be used to secure the footpad **112** to the adjustable support assembly **108**. The footpad **112** provides stability to the adjustable support assembly **108** and restricts movement of the adjustable support assembly **108** during the operation of the watercraft **101**.

[0034] In an embodiment, the motor mount assembly **100** further comprises an end cap **113** configured to receive and secure the motor support shaft **116** within a space **114** between the second end **108***b* of the adjustable support assembly **108** and the end cap **113**. In this embodiment, the motor mount assembly **100** further comprises a locking element **115** for locking the motor support shaft **116** within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113** for a pivotal connection or a rigid connection of the motor support shaft **116** to the adjustable support assembly **108**. In an embodiment as exemplarily illustrated in FIG. **3**, the motor support shaft **116** is pivotally connected to the adjustable support assembly **108** for steering the watercraft **101**. The locking element **115** is inserted into the end cap **121** and the second end **108***b* of the adjustable support assembly **108** in a direction as exemplarily illustrated by the arrow **304** in FIG. **3** for pivotal connection of the motor support shaft **116**. In another embodiment as exemplarily illustrated in FIGS. **6-8**, the motor support shaft **116** is rigidly connected to the adjustable support assembly **108** within the space **114** defined between the U-shaped second end **108***b* of the adjustable support assembly **108** and the end cap **113** for non-steering of the watercraft **101**. In the "non-steering" mode of operation, the rigid connection of the motor support shaft **116** to the adjustable support assembly **108** restricts steering of the watercraft **101** by restricting movement of the motor support shaft **116** within the space **114** defined between the second end **108***b* of the adjustable support assembly **108** and the end cap **113**.

[0035] The fastening elements **107***a* used for rigidly attaching a steering mount bracket **120** with an end cap **121** of the steering system **119** to the middle section **116***a* of the motor support shaft **116** are inserted into the end cap **121** and the steering mount bracket **120** in a direction as exemplarily illustrated by the arrow **303** in FIG. **3**.

[0036] FIG. **4** exemplarily illustrates a top exploded view of a steering embodiment of the motor mount assembly **100**. The steering embodiment of the motor mount assembly **100** is implemented when a user wishes to steer the watercraft **101** during operation. In the steering embodiment, a steering system **119**, as disclosed in the detailed description of FIG. **1** and FIG. **3**, is provided and the motor mount assembly **100** is configured for pivotal connection of the motor support shaft **116** within the space **114** defined between the second end **108***b* of the adjustable support assembly **108** and the end cap

113. The end cap **113** encloses the motor support shaft **116** within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113**. The user inserts the motor support shaft **116** into the space **114** as exemplarily illustrated in FIG. **3**, utilizes the end cap **113** to enclose the motor support shaft **116**, and inserts a locking element **115** through the end cap **113** and the second end **108***b* of the adjustable support assembly **108** to secure the motor support shaft **116** and allow the pivotal connection of the motor support shaft **116** with respect to the adjustable support assembly **108**.

[0037] FIG. **5** exemplarily illustrates a top view of a steering system **119** of the motor mount assembly **100**. The steering system **119**, as disclosed in the detailed description of FIG. **1**, comprises a steering mount bracket **120** with an end cap **121**, a tie rod **123**, and a steering handle **125**. The steering mount bracket **120** with the end cap **121** is rigidly attached to the middle section **116***a* of the motor support shaft **116** by the fastening elements **107***a*, for example, bolts. The fastening elements **107***a* are inserted into the end cap **121** and the steering mount bracket **120** in a direction as exemplarily illustrated by the arrow **303** in FIG. **3** and FIG. **5** for rigid attachment of the end cap **121** and the steering mount bracket **120** to the middle section **116***a* of the motor support shaft **116**. The steering mount bracket **120** and the end cap **121** together define a space **122** for receiving the middle section **116***a* of the motor support shaft **116** as exemplarily illustrated in FIG. **3**. The tie rod **123** is rigidly attached to the steering mount bracket **120** and provides a lateral offset for applying a steering force by the user on the motor support shaft **116**. A first end **125***a* of the steering handle **125** is hingedly connected to the tie rod **123**, for example, by a hinge **124**. A second end **125***b* of the steering handle **125** is disposed proximal to the user and enables the user to apply the steering force on the motor support shaft **116**. When the user applies a steering force on the motor support shaft **116** using the steering handle **125**, the tie rod **123** transfers the steering force from the steering handle **125** to the steering mount bracket **120** via the hinge **124**. The steering mount bracket **120** rotates along with the motor support shaft **116** due to the rigid connection between the steering mount bracket **120** and the motor support shaft **116**. This rotation of the motor support shaft **116** rotates the motor **117** connected at the bottom end **116***b* of the motor support shaft **116**. Thus, a steering force applied by the user on the steering handle **125** causes rotation of the motor **117** along with the motor support shaft **116**.

[0038] FIG. **6** exemplarily illustrates a side view of a non-steering embodiment of the motor mount assembly **100** on a watercraft **101**. The non-steering embodiment of the motor mount assembly **100** is implemented when a user does not wish to steer the watercraft **101** during operation. In this embodiment, the steering system **119** exemplarily illustrated in FIG. **1**, FIG. **3**, and FIG. **5**, is not connected to the motor support shaft **116** of the motor mount assembly **100**. In the non-steering embodiment, the motor support shaft **116** is rigidly connected to the second end **108***b* of the adjustable support assembly **108** using the end cap **113**.

[0039] As exemplarily illustrated in FIG. **6**, the control system **126** is disposed proximal to the user within the watercraft **101** and enables the user to change speed and direction of rotation of the motor **117**. The control system **126** is in electric communication with the battery **103** and the motor **117** via wires **127** or insulated electric cables. The wires **127** are supported by the motor support shaft **116** and then run alongside the adjustable support assembly **108** towards the user.

[0040] FIGS. **7-8** exemplarily illustrate exploded views of a non-steering embodiment of the motor mount assembly **100**. In the non-steering embodiment, the motor support shaft **116** is rigidly connected to the second end **108***b* of the adjustable support assembly **108** using the end cap **113**. In this embodiment, the user inserts the motor support shaft **116** at the second end **108***b* of the adjustable support assembly **108** and encloses the motor support shaft **116** using the end cap **113** for rigidly connecting the motor support shaft **116** within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113**. The user uses the locking elements **115**, for example, bolts to rigidly connect the motor support shaft **116** to the second end **108***b* of the adjustable support assembly **108**. The bolts are longitudinally threaded into the abutting end cap **113** and the second end **108***b* of the adjustable support assembly **108** in a direction as exemplarily illustrated by the arrow **701** in FIGS. **7-8**.

[0041] FIG. **9** illustrates a method for detachably attaching a motor **117** to a watercraft **101**. A motor mount assembly **100** comprising a battery housing **102**, a mounting flange **106**, an adjustable support assembly **108** comprising multiple interconnected sliding members **110***a* and **110***b*, and a motor support shaft **116** as disclosed in the detailed description of FIGS. **1-8**, is provided **901**. The battery housing **102** is releasably secured **902** to the watercraft **101**. The battery housing **102** is configured to accommodate a battery **103** that powers the motor **117**. The mounting flange **106** is detachably attached **903** to the battery housing **102**. The detachably attached mounting flange **106** extends outwardly from the battery housing **102** within the watercraft **101**. A first end **108***a* of the adjustable support assembly **108** is detachably attached **904** to the mounting flange **106** to support the motor support shaft **116**. The sliding members **110***a* and **110***b* of the adjustable support assembly **108** are adjusted and locked **905** in a position based on length of the watercraft **101**. The motor support shaft **116** is connected **906** to the second end **108***b* of the adjustable support assembly **108** and positioned substantially vertical to the adjustable support assembly **108**. The motor **117** is connected **907** to a bottom end **116***b* of the motor support shaft **116**.

[0042] Consider an example where a user wishes to detachably attach a motor **117** to a watercraft **101**, for example, a kayak, for electrically powering the watercraft **101**. The user disposes the battery housing **102** of the motor mount assembly **100** disclosed herein at a suitable position on the watercraft **101** taking into account various parameters, for example, the centre of gravity, balance of loads, etc. of weight locations in the watercraft **101**. The weight of the battery **103** aids in securing the battery housing **102** and counter balances the weight of the motor **117**. The user may position the battery housing **102** within, for example, a predesigned enclosure **202** as exemplarily illustrated in FIG. **2**, of the watercraft **101** for accommodating the battery housing **102**. The user releasably secures the battery housing **102** to the watercraft **101** using the clamping elements **104**, for example, tension springs. Each of the clamping elements **104** comprises hooks **105** on opposing ends **104***a* and **104***b*. The user inserts the opposing hooks **105** of each of the clamping elements **104** into one of the protruding recesses **101***a* on the watercraft **101** and a proximal one of the prefabricated recesses **102***a* on the battery housing **102**. These clamping elements **104** extend

under a tension or a tensile force and secure the battery housing **102** to the watercraft **101**.

[0043] The user detachably attaches the mounting flange **106**, for example, the T-shaped frame to the releasably secured battery housing **102** using multiple fastening elements **107**, for example, threaded bolts **107***c* and nuts **107***b*. The user mounts the adjustable support assembly **108** on the mounting flange **106** in a direction as exemplarily illustrated by the arrow **301** in FIG. **3**. The user adjusts the adjustable support assembly **108** comprising, for example, two sliding members **110***a* and **110***b* by sliding one of the sliding members **110***a* or **110***b* within another sliding member **110***b* or **110***a* in directions as exemplarily illustrated by the arrows **302** in FIG. **3**. The user adjusts the adjustable support assembly **108** based on a length of the watercraft **101**. The length of the adjustable support assembly **108** is adjustable, for example, between about 12 inches and about 52 inches. The user locks each of the sliding members **110***a* and **110***b* of the adjustable support assembly **108** in a position using the locking pins **109***b*. The user inserts the locking pins **109***b* into the matching recesses **111** of the sliding members **110***a* and **110***b* to lock the sliding members **110***a* and **110***b*. The motor mount assembly **100** is mounted on the watercraft **101** with a sit inside configuration or the watercraft **101** with a sit-on-top configuration. In the sit inside configuration, the user sits on a depression in the watercraft **101** whereas in a sit-on-top configuration the user sits on the surface of the watercraft **101**. The user may sit on a seat (not shown) provided in the watercraft **101** that allows the user to sit on top or sit inside the watercraft **101**.

[0044] In the steering mode of operation, the user may wish to steer the watercraft **101** using the steering system **119**. For this mode of operation, the user pivotally connects the motor support shaft **116** to the second end **108***b* of the adjustable support assembly **108** and encloses the motor support shaft **116** using the end cap **113**. The user inserts the motor support shaft **116** within the space **114** defined between the second end **108***b* of the adjustable support assembly **108** and the end cap **113** and inserts a locking element **115** through the end cap **113** to allow the pivotal connection of the motor support shaft **116** within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113**. The locking element **115** is, for example, inserted through the end cap **113** and the second end **108***b* of the adjustable support assembly **108** in a direction as exemplarily illustrated by the arrow **304** in FIGS. **3-4**. The motor mount assembly **100** for the steering mode of operation is exemplarily illustrated in FIG. **1** and FIG. **3**.

[0045] The steering system **119** is then rigidly attached on the middle section **116***a* of the motor support shaft **116**. The user rigidly attaches the steering mount bracket **120** with the end cap **121** to the middle section **116***a* of the motor support shaft **116**. The user inserts the fastening elements **107***a* into the end cap **121** and the steering mount bracket **120** in a direction as exemplarily illustrated by the arrow **303** in FIG. **3** for rigidly attaching the steering mount bracket **120** with the end cap **121** to the middle section **116***a* of the motor support shaft **116**. The user then rigidly attaches the tie rod **123** to the steering mount bracket **120**. The user then connects the steering handle **125** to the tie rod **123** via the hinge **124**. The steering handle **125** is extendible to a length as desired by the user in order to conveniently operate the steering system **119** and change the direction of movement of the watercraft **101**.

[0046] In the non-steering mode of operation, the user may wish to not steer the watercraft **101**. For this mode of operation, the motor support shaft **116** is rigidly connected within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113**. The user inserts the motor support shaft **116** within the space **114** defined by the second end **108***b* of the adjustable support assembly **108** and the end cap **113** and inserts locking elements **115**, for example, two bolts through the end cap **113** to rigidly connect the motor support shaft **116** to the second end **108***b* of the adjustable support assembly **108**. The direction of insertion of the locking elements **115** through the end cap **113** is exemplarily illustrated by the arrow **701** in FIGS. **7-8**. The motor mount assembly **100** for the non-steering mode of operation is exemplarily illustrated in FIGS. **6-8**.

[0047] The inserted, pivotally or rigidly attached, motor support shaft **116** now detachably attaches the motor **117** or the casing **118** of the motor **117** to the watercraft **101**. The motor **117** is electrically powered by the battery **103**, for example, a 12-volt battery, accommodated in the battery housing **102**. Furthermore, the user utilizes the control system **126** to control the transfer of electrical power from the battery **103** to the motor **117**.

[0048] FIG. **10** exemplarily illustrates a control system **126** of the motor mount assembly **100** in electric communication with a battery **103** and a motor **117**. The control system **126** may be clipped onto a life vest of the user. The control system **126** is in electric communication with the battery **103** and the motor **117** via the wires **127**. The wires **127** are supported by the motor support shaft **116** and then run alongside the adjustable support assembly **108** towards the user. The control system **126** allows the user to change the direction of rotation of the motor **117**, for example, in a clockwise direction or a counter clockwise direction, based on a desired direction of movement of the watercraft **101**, for example, forward or reverse direction. The user also utilizes the control system **126** to change speed of rotation of the motor **117**.

[0049] FIGS. **11A-11C** exemplarily illustrate steering movement of the watercraft **101** using the steering system **119** of the motor mount assembly **100**. The motor mount assembly **100** as illustrated in the top views of FIGS. **11A-11C** is mounted at the stern of the watercraft **101**. The motor mount assembly **100** may also be mounted at the bow of the watercraft **101**.

[0050] As exemplarily illustrated in FIG. **11A**, the steering handle **125** of the steering system **119** is in a mean position, that is, the steering handle **125** is neither pushed away or pulled towards the user. This mean position of the steering handle **125** keeps the motor **117** in line with the longitudinal axis **129** of the watercraft **101**.

[0051] As exemplarily illustrated in FIG. **11B**, the steering handle **125** of the steering system **119** is shown pulled towards the user. The steering handle **125** in this position is disposed proximal to the user. This pulled position rotates the motor **117** towards the left of the watercraft **101**. Thus, the rotation of the motor **117** towards the left of the watercraft **101** causes the watercraft **101** to be steered in the rightward direction, that is, the watercraft **101** is steered to the right of the longitudinal axis **129**.

[0052] As exemplarily illustrated in FIG. **11C**, the steering handle **125** of the steering system **119** is shown pushed away from the user. The steering handle **125** in this position is disposed farther away from the user. This pushed position rotates the motor **117** towards the right of the watercraft **101**.

Thus, the rotation of the motor **117** towards the right of the watercraft **101** causes the watercraft **101** to be steered in the leftward direction, that is, the watercraft **101** is steered to the left of the longitudinal axis **129**.

[0053] The foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present invention disclosed herein. While the invention has been described with reference to various embodiments, it is understood that the words, which have been used herein, are words of description and illustration, rather than words of limitation. Further, although the invention has been described herein with reference to particular means, materials and embodiments, the invention is not intended to be limited to the particulars disclosed herein; rather, the invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims. Those skilled in the art, having the benefit of the teachings of this specification, may effect numerous modifications thereto and changes may be made without departing from the scope and spirit of the invention in its aspects.

I claim:

1. A motor mount assembly for detachably attaching a motor to a watercraft, comprising:

a battery housing disposed on and releasably secured to said watercraft, wherein said battery housing is configured to accommodate a battery that powers said motor;

a mounting flange detachably attached to and extending outwardly from said battery housing within said watercraft;

an adjustable support assembly mounted on said mounting flange, wherein a first end of said adjustable support assembly detachably attaches to said mounting flange, and wherein a second end of said adjustable support assembly supports a motor support shaft; and

said motor support shaft connected to said second end of said adjustable support assembly and positioned substantially vertical to said adjustable support assembly, wherein a bottom end of said motor support shaft is connected to said motor;

whereby said motor is detachably attached to said watercraft via said motor support shaft.

2. The motor mount assembly of claim **1**, wherein said second end of said adjustable support assembly is configured to receive said motor support shaft.

3. The motor mount assembly of claim **2**, further comprising an end cap configured to receive and secure said motor support shaft within a space defined between said second end of said adjustable support assembly and said end cap.

4. The motor mount assembly of claim **3**, wherein said motor support shaft is pivotally connected within said space defined by said second end of said adjustable support assembly and said end cap for steering said watercraft.

5. The motor mount assembly of claim **3**, wherein said motor support shaft is rigidly connected within said space defined by said second end of said adjustable support assembly and said end cap for non-steering of said watercraft.

6. The motor mount assembly of claim **3**, further comprising a locking element for locking said motor support shaft within said space defined by said second end of said adjustable support assembly and said end cap for one of a pivotal connection and a rigid connection of said motor support shaft to said adjustable support assembly.

7. The motor mount assembly of claim **1**, further comprising a steering system rigidly attached to a middle section of said motor support shaft, wherein said steering system comprises:

a steering mount bracket with an end cap rigidly attached to said middle section of said motor support shaft, wherein said steering mount bracket and said end cap together define a space for receiving said middle section of said motor support shaft;

a tie rod rigidly attached to said steering mount bracket, wherein said tie rod provides a lateral offset for applying a steering force by a user on said motor support shaft; and

a steering handle hingedly connected to said tie rod, wherein a first end of said steering handle is hingedly connected to said tie rod, and a second end of said steering handle is disposed proximal to said user to enable said user to apply said steering force on said motor support shaft.

8. The motor mount assembly of claim **1**, further comprising a casing for accommodating said motor, wherein said casing with said accommodated motor is connected to said bottom end of said motor support shaft.

9. The motor mount assembly of claim **1**, further comprising clamping elements to releasably secure said battery housing to said watercraft.

10. The motor mount assembly of claim **1**, wherein said mounting flange is a T-shaped frame detachably attached to said battery housing by a plurality of fastening elements.

11. The motor mount assembly of claim **1**, wherein said first end of said adjustable support assembly is detachably attached to said mounting flange by a locking pin.

12. The motor mount assembly of claim **1**, wherein said adjustable support assembly comprises a plurality of interconnected sliding members adjustable for varying lengths of said watercraft.

13. The motor mount assembly of claim **12**, wherein each of said sliding members of said adjustable support assembly comprises a plurality of recesses for receiving one or more locking pins, wherein said one or more locking pins lock said sliding members to each other in a position based on length of said watercraft.

14. The motor mount assembly of claim **1**, further comprising a footpad connected to said adjustable support assembly and positioned between said adjustable support assembly and said watercraft for supportively cushioning said adjustable support assembly on said watercraft.

15. The motor mount assembly of claim **1**, wherein said accommodated battery is in electric communication with said motor connected to said motor support shaft for electrically powering said motor.

16. The motor mount assembly of claim **15**, further comprising a control system in electric communication with said accommodated battery and said motor for controlling discharge of electrical power from said accommodated battery to said motor during operation of said motor, wherein said control system is disposed proximal to a user within said watercraft and enables said user to change speed and direction of rotation of said motor.

17. A method for detachably attaching a motor to a watercraft, comprising:

providing a motor mount assembly comprising a battery housing, a mounting flange, an adjustable support

assembly comprising a plurality of interconnected sliding members, and a motor support shaft;

releasably securing said battery housing to said watercraft, wherein said battery housing is configured to accommodate a battery that powers said motor;

detachably attaching said mounting flange to said battery housing, wherein said detachably attached mounting flange extends outwardly from said battery housing within said watercraft;

detachably attaching a first end of said adjustable support assembly to said mounting flange, wherein said adjustable support assembly supports said motor support shaft;

adjusting said sliding members of said adjustable support assembly and locking said sliding members in a position based on length of said watercraft;

connecting said motor support shaft to a second end of said adjustable support assembly and positioning said motor support shaft substantially vertical to said adjustable support assembly; and

connecting said motor to a bottom end of said motor support shaft.

18. The method of claim **17**, further comprising receiving and securing said motor support shaft within a space defined by said second end of said adjustable support assembly and said end cap.

19. The method of claim **18**, further comprising pivotally connecting said motor support shaft within said space defined by said second end of said adjustable support assembly and said end cap for steering said watercraft.

20. The method of claim **18**, further comprising rigidly connecting said motor support shaft within said space defined by said second end of said adjustable support assembly and said end cap for non-steering of said watercraft.

21. The method of claim **17**, wherein said motor mount assembly further comprises a steering system rigidly attached to a middle section of said motor support shaft, wherein said steering system enables a user to operatively change direction of said watercraft, wherein said steering system comprises:

a steering mount bracket with an end cap rigidly attached to said middle section of said motor support shaft, wherein said steering mount bracket and said end cap together define a space for receiving said middle section of said motor support shaft;

a tie rod rigidly attached to said steering mount bracket, wherein said tie rod provides a lateral offset for applying a steering force by said user on said motor support shaft; and

a steering handle hingedly connected to said tie rod, wherein a first end of said steering handle is hingedly connected to said tie rod, and a second end of said steering handle is disposed proximal to said user to enable said user to apply said steering force on said motor support shaft.

22. The method of claim **17**, further comprising electrically powering said motor by said accommodated battery in electric communication with said motor.

23. The method of claim **22**, further comprising controlling discharge of electrical power from said accommodated battery to said motor during operation of said motor by a control system in electric communication with said accommodated battery and said motor.

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