Abstract: A chair for marine and other applications that allows for an individual to sit while driving a vehicle and adjusts to provide support when the individual is standing in the vehicle. At least certain embodiments of the present invention include a base, an adjustable member with a upper and lower body, seat bottom, a pair of first, second and third linking members, and a seat back with a front and rear face. An embodiment of the chair may be easily manually operated to adjust the seat back of the chair fore and aft of the base, depending upon whether the individual desires support in a seated or standing position. The chair may be used in any type of air, land, or water vehicle in which a driver may have a need to stand as well as sit.
ADJUSTABLE CHAIR FOR MARINE AND OTHER APPLICATIONS

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CROSS-REFERENCE TO RELATED APPLICATIONS

[0001]  This application is a non-provisional of US provisional patent application 60/938,619, filed May 17, 2007, which is incorporated by reference as if fully recited herein.

INVENTIVE FIELD

[0002]  The present invention is directed to a chair for marine and other applications. More particularly, the present invention is directed to a chair that allows for an individual to sit while driving a vehicle and adjusts to provide support when the individual is standing in the vehicle.

BACKGROUND OF THE INVENTIVE FIELD

[0003]  The helm of a boat, which consists of the driver's seat, along with the steering wheel, gauges and controls, is a dynamic environment in which the driver is often changing postures from sitting to standing. It is also not unusual that a driver may even change positions with another passenger while the boat is under way. The motion of the boat through the water also adds further balance and stability problems that are unique to the boating environment. A boat driver's chair is needed that both creates space for standing and supports the driver while standing.

[0004]  Recreational boating ranks second after motor vehicles in accidents and fatalities among all modes of transportation, with almost 1000 fatalities and reported property damage exceeding 25.9 million dollars a year. It is possible that many of
these accidents could be avoided by improving the visibility of the driver (i.e., the ability of the driver to see to the front of the boat). Poor visibility from the helm of the boat may limit a driver’s ability to see other boats or obstacles in the water and thus create many of these accidents.

[0005] The ability of the boat driver to see to the front and the sides of the boat is also extremely important because of the constantly changing conditions on the water. Little attention has been paid to the problems inherent in helm design, the driver’s ability to see to the front, side and rear of the boat while sitting and standing is poor.

[0006] It is estimated that over 1.1 million people are in danger in the water due to falling overboard or being unable to get back into the boat. The Ohio Division of Natural Resources reported 104 boating fatalities between 2000 and 2005; of these 104 deaths, falling overboard was the cause of 38. Sometimes individuals fall overboard while standing at the helm of the boat, or when improperly sitting on the back of the chair while trying to improve visibility. People who have fallen overboard may also be harder to see due to poor visibility from the helm. A study of accident investigation methodology showed that accidents often occur in speedboats due to underlying factors in the design of the speedboat and obscured vision. By providing a safe and easy way for drivers to stand and creating better visibility, the potential for these accidents to occur may be reduced.

[0007] Driver distraction or fatigue may also pose a safety risk on the water. Most researchers agree that maintaining a static posture for an extended period of time is a significant factor in developing upper-extremity and back disorders. Although the boat is being operated in a dynamic environment, if the operator is driving for an
extended period of time, he/she still should not be maintaining a constant posture. Many studies of individuals in situations similar to boating demonstrate that vibration is believed to be a cause of the development of chronic pain and disorders. Changing positions or postures helps to eliminate the injuries that may develop as a result of this vibration. By creating a way for boat drivers to easily switch between sitting and standing, the concern of fatigue may be addressed by allowing easy changes in posture.

In addition to providing poor visibility, most helm stations are difficult to enter and exit. Although most drivers prefer to stand all or part of the time while driving, standing is often restricted because of the design and layout of the helm. Often the chair is too close to the steering wheel to allow for standing. A problem is that people often will sit on top of the chair when it is in the raised position, which is dangerous because they may fall out of the boat or slide forward off the chair and hit the steering wheel or windshield. Designers have added warning stickers to chairs, but these warnings are often ignored by boat drivers. Another issue with chair designs is they typically do not create enough room between the chair and steering wheel for drivers of different sizes. Despite the common knowledge of poor helm ergonomics, there still is a need for increased ergonomics in many recreational boats.

Consequently, it can be understood that there is a need for a chair that supports a driver in both a sitting and standing position on marine applications. Exemplary embodiments seek to address the void of adequate driver support in boat helms by providing a new chair that would support drivers in seated and standing positions. It is preferred that such a chair would provide a quick and easy transition
between the sitting and standing positions. It is also preferable that such a chair
would aid in the driver's visibility while sitting or standing. An exemplary embodiment
may incorporate better ergonomics and allowing for easy ingress and egress of the
marine vehicle. A chair of the present invention satisfies these needs/preferences.
Such a chair may be used in other types of land vehicles such as construction or
farming equipment as well as in aircraft. The chair may be used in any type of
vehicle in which a driver may have a need to stand as well as sit.

SUMMARY OF THE GENERAL INVENTIVE CONCEPT

[0010] The present invention is directed to a chair that allows for an individual to
sit while driving a marine vehicle or other type of vehicle and adjusts to provide
support when the individual is driving the vehicle. At least certain embodiments of
the present invention include a base, an adjustable member with a upper and lower
body, seat bottom, a pair of first, second and third linking members, and a seat back
with a front and rear face. An embodiment of the chair may be easily manually
operated to adjust the seat back of the chair fore and aft of the base, depending
upon whether the individual desires support in a seated or standing position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] In addition to the features mentioned above, other aspects of the present
invention will be readily apparent from the following descriptions of the drawings and
exemplary embodiments, wherein like reference numerals across the several views
refer to identical or equivalent features, and wherein:

[0012] FIG. 1 is a perspective view illustrating one exemplary embodiment of a
chair in the seated position;
[0013] FIG. 2 illustrates a right-side view of the embodiment of FIG. 1 transitioning from the seated position to the standing position;

[0014] FIG. 3 is an enlarged perspective view, depicting an embodiment of the adjustable member of FIG. 1;

[0015] FIG. 4 is a perspective view, depicting an individual using an exemplary embodiment of the chair in the seated position; and

[0016] FIG. 5 is a perspective view, depicting an individual using the embodiment of FIG. 5 in the standing position.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENT(S)

[0017] Figure 1 depicts one exemplary embodiment of the present invention. As shown, this particular adjustable chair 10 (hereinafter "chair") is shown to have a base 100, an adjustable member 102 with a upper and lower body 104, 106, a means for adjusting 108 that is adapted to allow an individual to slide the upper body 104 in a substantially horizontal direction fore and aft of the lower body 106, and a support member 110 located towards the distal end of top body 104 that projects downward from the top body 104. Additionally, this particular chair 10 includes a pairs of first, second and third linking members 112, 114, and 116, each having first and second ends 112a and 112b, 114a and 114b, 116a and 116b. Furthermore, this particular chair has a seat back 118 with a front and rear face 120 and 122 and a seat bottom 124.

[0018] In this exemplary embodiment, the base 100 includes a substantially vertical member that is round in cross-section and a substantially round lower end that is adapted to be attached to the deck of a marine vehicle or other type of vehicle.
by the use of bolts or other fastening means. However, depending on the materials used to construct a cleaning device of the present invention, and or other design or operational factors, one skilled in the art would understand that the base 100 may also be attached to the deck of a vehicle by any number of fastening means, such as various threaded fasteners, adhesives, welding, etc. In this embodiment, the vertical member is integral with the round lower end, such as by molding or other manufacturing techniques, but need not be in other embodiments. Additionally, in other embodiments, the cross-section of the vertical member may be any number of geometries. Although the base 100 is made of stainless steel in this embodiment, many other materials that possess the properties required for use in a marine environment may be used.

[0019] Although this embodiment of the base 100 does not include any means for adjusting the base 100, other embodiments may include a means for adjusting the base 100. For example, an exemplary embodiment of the chair 10 may allow an individual to rotatably adjust the base to a variety of positions. In another example, the length of the base 100 may be adjusted in the vertical direction upwardly and downwardly. In yet another example, the base 100 may be pivotably connected to the hull of the vehicle in a manner that allows the angle therebetween to be adjusted and set. The angle between the base 100 and the hull may be set by a number of mechanisms. In a further example, one skilled in the art would realize that one could combine any number of combinations of adjusting the base rotatably, vertically in length and pivotably connected, and these combinations are anticipated by exemplary embodiments of the chair 10.
The adjustable member 102 allows an individual to adjust the chair to both a seated and standing position, as depicted in FIGS. 2, 4 and 5. As depicted in FIG 3, in one particular embodiment of the chair 10, an adjustable member 102 includes the upper and lower body 104, 106. In this particular embodiment, the upper and lower bodies 104 and 106 are slidibly engaged, wherein there is only one degree of freedom for the top body 104 to move forward or backward in relation to the lower body 106, substantially horizontal direction and parallel to the deck of the vehicle. In this embodiment, the means for adjusting 108 the adjustable member 102 is a lever located at the front of the upper body 104 that is adapted to be grasped by an individual. The lever allows an individual to lock the upper body 104 at multiple positions in relation to the lower body 106. In other embodiments, the means for adjusting may be a foot lever adapted to be engaged by an individual's foot. Additionally, in other embodiments, one skilled in the art would realize that the means for adjusting may be any number of components that allow an individual to engage the component while adjusting the chair 10, including, but not limited to: buttons, chords, etc. The adjustable member 102 creates various chair positions that gives the individual options about where their seat back 118 and seat bottom 124 are located.

In this particular embodiment, the upper body 104 is slidibly engaged with the lower body 106 by a track system. At least a portion of the left and right edges of the lower body 106 are adapted to engage a corresponding track located on the bottom face of the upper body 104. The upper body 104 moves in relation to the lower body 106 when a mechanism in association with the lever is engaged by an individual. When the mechanism is engaged, the individual may move the upper
body 104 in relation to the lower body 106. When the individual disengages the mechanism, the upper body 104 will lock into position with the lower body 106. It is preferred that the adjusting member has stops that do not allow the upper body 104 from the lower body 106 by limiting the forward and backward movement of the upper body 104 in relation to the lower body 106. Although this particular embodiment uses an adjustable member 102 that includes a track system, one skilled in the art would realize that there are other ways to allow the upper body 104 to move fore and aft the lower body 106 and lock in a multiple of positions, and such are contemplated by the present invention.

[0022] As mentioned above, other embodiments of the chair may employ a mechanical means to facilitate moving the chair from the seated to standing position. In one embodiment, the adjustable member 102 is spring-loaded to aid in positioning the chair to either the seated or standing positions. In another embodiment, the adjustable member 102 is power-driven. One skilled in the art would realize that any number of power-driven components may be used to facilitate motion of the adjustable member, including but not limited to: motors, pneumatic cylinders, gears, etc.

[0023] In this particular embodiment, the lower body 106 is adapted to be secured to the base 100 by a collar that receives and engages at least a portion of the upper end of the vertical member of the base 100 and may be tightened by an individual to the base 100 by a setscrew mechanism. In this embodiment, the collar is substantially round in shape. Other embodiments may use different geometries for engaging the base 100, depending upon the size and geometry of the base 100. In this embodiment, an individual rotates the setscrew mechanism so that the setscrew
engages the base 100 to secure the lower body 106 to the base. In other embodiments, the rotation of the setscrew may cause the collar to reduce in diameter and engage a portion of the base 100. Other embodiments may contain additional setscrews to facilitate securing the lower body 106 to the base 100. Depending upon design criteria and other factors, one skilled in the art would understand that the lower body 106 may be attached to the base 100 by any number of securing means, including, but not limited to: welding, clamping, soldering, nailing, riveting, etc. Furthermore, the lower body 106 may be integral with the base 100, such as by molding, casting or other manufacturing techniques. Although steel is used in this embodiment, any number of materials that may withstand a marine environment may be used to fabricate the lower body 106, as would be understood by one skilled in the art. Furthermore, in other embodiments, the lower body 106 may be pivotably connected with the base 100 to allow an individual to manually or mechanically adjust the angle between the lower body 106 and the base 100 at various positions, creating a tilting chair 10.

[0024] In this embodiment, both the left and right sides of the upper body 104 have a support member 110 located towards the distal end of each side that project downward from the upper body 104. Preferably, but not necessarily, the support member 110 is integral with the upper body 106. In other embodiments, the support member may be secured to the upper body 106 by any number of securing means, as would be understood by one skilled in the art. The support member may be fabricated from any number of materials, although in this embodiment, the support member is made of steel.
It is preferred the support member is adapted to receive a means for pivotably connecting the second end 116b of the third linking member 116. In this embodiment, the means for receiving is a hole located towards the bottom edge of the supporting member 110. In other embodiments, depending on the type of pivotable connectment used, one skilled in the art would understand that the support member 110 may be adapted to engage the means for pivotably connected the support member 110 and the third linking member 116. In this embodiment, the geometry of the support member 110 is substantially the shape of a right triangle, wherein the right angle of the triangle is located at distal end of the upper body. However, in other embodiments, the support member 110 may be any number of geometries and sizes that allow securing the third linking member 116 to the support member 110, as one skilled in the art would realize, including, but not limited to: rectangular, triangular, parallelogram, round, etc.

The upper face of the upper body 104 is adapted to engage and secure a seat bottom 124. In this embodiment, the upper body 104 has four holes that are substantially symmetrically located towards the four corners of the upper body 104, wherethrough a bolt or screw may pass to facilitate securement. In another embodiment, the seat bottom 124 may be removably attached to the upper body 104 by a hook and loop material such as Velcro®, wherein an individual may remove the seat bottom 124 by using a force greater than the force used to removably attach the seat bottom 124 to the upper body 104. One skilled in the art would realize that there are other ways that the seat bottom 124 could be secured with the upper body 104, and such are contemplated by exemplary embodiments of the chair 10.
[0027] The seat bottom 124 has a substantially horizontal surface, in this embodiment and is adapted to engage the upper body 104 of the adjustable member 102. Preferably, but not necessarily, the seat bottom 124 is adapted to engage the backside and upper legs of an individual. In this embodiment, the seat bottom 124 includes a foam interior to cushion an individual who sits in the seat and is surrounded by a nylon outer shell. To that end, any number of materials may be used to cushion the individual. It is also preferred, but not necessary, that any materials used to surround the cushion are durable and waterproof, due to the harsh marine environment where the chair 10 is used. In other environments that may be enclosed such as in driver compartments for construction equipment or aircraft, other materials may be used.

[0028] In operation of the chair 10, the first, second and third pairs of linking members 112, 114 and 116 facilitate the movement of the chair 10 from the seated to standing position, and the converse. In this embodiment, each pair of linking members are substantially symmetrical and are situated on the left and right side of chair. In this particular exemplary embodiment shown herein, each linking member is pivotably connected to other components of the chair 10. The first linking members 112 are pivotably connected to the base 100 by a jaw slide at the first end 112a and pivotably connected to the seat back 124 at the second end 112b by a hole located in the second end 112b, wherein bolts secure the first linking member 112 to the seat back 124 and allow the pivoting motion.

[0029] In this embodiment, the second linking members 114 are pivotably connected at the first end 114a to the seat back 124 in a manner similar to the first linking member 112. The second end 114b is pivotably connected to the first end
116a of the corresponding third linking member 116 by a combination of an eye hook connected with a jaw slide by a nut and bolt. In such an arrangement, the eye hook holds at least a portion of the first end 116a of the third linking member 116, wherein a setscrew secures the eye hook to the third linking member 116. The jaw slide is secured to the second end 114b of the second linking member 114, wherein the securement force may be increased by tightening a setscrew. In this embodiment, the second linking member 114 is pivotably connected to the base 100 by a jaw slide at a location between pivotable connectments at the first and second ends 114a and 114b.

[0030] In this embodiment, the third linking members 116 are pivotably connected at the first second end 116b to the support member 110 by a bolt and nut combination substantially similar to how the first and second linking members 112 and 114 may be connected to the seat back 124. While the means for pivotably connecting the linking members 112, 114 and 116 to other components are of a certain design in this embodiment, it is to be understood by one skilled in the art that such pivotable connectments may be of virtually any shape or size to pivotably connect the linking members to other components, depending upon design or operational factors. Currently, other means for pivotably connecting the linking members 112, 114 and 116 to other components include, but are not limited to a ball and socket.

[0031] In this embodiment, the first, second, and third pairs of linking members 112, 114 and 116 are tubular in shape. As such, the linking members 112, 114 and 116 may be manufactured from readily available sizes of bar stock, thereby reducing manufacturing time and expense. However, it should be realized that the linking
members 112, 114 and 116 may have any number of cross-sectional geometries that are strong enough to withstand use of chair 10, whether by a user during manual operation, or by a machine during automated operation. Similarly, the linking members 112, 114 and 116 may be made of any number of materials that are of sufficient strength to permit proper operation of the chair 10. The linking members 112, 114 and 116 of the chair 10 may also be constructed from various materials, such as, for example, steel, fiberglass, plastics, or other metals. Preferably, the linking members 112, 114 and 116 have sufficient strength to withstand the use of the chair 10.

[0032] Adjustment of the chair 10 may be accomplished in a number of ways. For example, in certain embodiments, the linking members 112, 114 and 116 may be adjustable in length. In one embodiment, each linking member may be telescoping in design, with a setscrew provided to fix the length of each linking member. One skilled in the art would realize that there is a multitude of other ways to fix the length of the linking members, and all are contemplated by exemplary embodiments of the chair 10.

[0033] In this embodiment, the seat back 118 has a front and rear face 120 and 122 that are substantially vertical at both the seated and sitting positions of the chair 10. Additionally, the seat back 118 is pivotally connected by a frame to the first and second linking members 112 and 114. The frame is situated substantially horizontal and between the front and rear faces 120 and 122. The front and rear faces 120 and 122 include a cushioned material surrounded by a waterproof material that is similar to the seat bottom 124. However, similar to the seat bottom 124, any number of cushioning materials and surrounding materials may be used, depending upon the
design and operational factors. While this embodiment of the seat back 118 has cushioning on the front and rear faces 120 and 122, other embodiments may only have cushioning on the front face 120.

[0034] As described above and seen in FIGS. 2, 4 and 5, an individual using at least certain embodiments of the chair 10 may adjust and lock the adjustable member 102 at various positions. In certain embodiments, when the individual adjusts the upper body 104 backward from the seated position to the standing position, the seat back 124 moves forward to provide support to the individual while standing. The backward movement of the upper body 106 creates more space for the individual to move between the chair 10 and the steering mechanism for a vehicle. Additionally, the forward movement of the seat back 124 provides support for the individual to lean against either horizontally and/or vertically. During adjustment of the chair 10 from the seated to standing positions, it is preferred, but not necessary that the front and rear faces 120 and 122 of the seat back 118 maintain a position that is substantially vertical, and substantially perpendicular to the seat bottom 124. Many times a second individual serves as a spotter during operation of the vehicle. Although not found in this embodiment, other embodiments of the chair 10 may allow the seat back 124 to move far enough forward to allow the second individual to sit in the chair 10 facing in the backwards direction. In this example, it is preferable that the rear face 122 of the seat back 118 is adapted to engage the second individual and is cushioned for the second individual's comfort, as described above.

[0035] The chair of the present invention may be used in any air, land, or water vehicle in which a driver may have a need to stand as well as sit. A driver may
benefit from the chair of the present invention regardless of the type of vehicle in which it is installed. While certain embodiments of the present invention are described in detail above, the scope of the invention is not to be considered limited by such disclosure, and modifications are possible without departing from the spirit of the invention as evidenced by the following claims:
WHAT IS CLAIMED IS:

1. A chair comprising:
   a base;
   an adjustable member with a upper body that slidingly engages a lower body, wherein the lower body is attached to the top of the base, a means for adjusting is adapted to allow an individual to slide the upper body in a substantially horizontal direction fore and aft of the lower body, the upper body has a support member located towards its distal end projecting downward;
   a seat bottom that has a substantially horizontal surface and is attached to the upper body of the adjustable member;
   a pair of first linking members situated on the left and right side of the chair that are pivotably connected to the base at a first end and pivotably connected to the seat back at a second end on both the left and right side of the chair;
   a pair of second linking members situated on the left and right side of the chair that are pivotably connected to the support member of the seat back at a first end and pivotably connected to the a third linking member at a second end and pivotably connected to the base, the pair of third linking members situated on the left and right side of the chair are pivotably connected to the securing member at a first end and connected to the second linking member back at a second end; and
   a seat back with a front and rear face that is substantially vertical and pivotably connected to the first and second linking members.

2. The chair of claim 1, wherein the means for adjusting is a lever adapted to be grasped by an individual.
3. The chair of claim 1, further comprising a foot lever adapted to allow an individual to adjust the chair.

4. The chair of claim 1, wherein the pairs of first, second and third linking members are adjustable in length.

5. The chair of claim 1, wherein the adjustable member is spring-loaded to aid positioning the chair in the seated or standing position.

6. The chair of claim 1, wherein the adjustable member is power-driven to aid positioning the chair in the seated or standing position.

7. The chair of claim 1, wherein the seat back is adapted to support an individual on the front and rear face.
Figure 5
INTERNATIONAL SEARCH REPORT

International application No
PCT/US 08/64126

A CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B60N 2/22 (2008 04)
USPC - 297/354 12

According to International Patent Classification (IPC) or to both national classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC 297/354 12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 297/18, 130, 300 1, 340, 354 12, 423 12 - text limited - see search terms below

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (DB+ PGPB,USPT,EPAB,JPAB), GOOGLE SCHOLAR - Search Terms Used: adjustable, swingback, seat, boat, pedestal, slider, support, link, linking, linkage, lilly blame, sarah netson, Carolina gill, ohio state university research foundation, etc

C DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of the relevant passages</th>
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I Further documents are listed in the continuation of Bo. C

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
X document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
Y document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search
23 August 2008 (23 08 2008)

Date of mailing of the international search report
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