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RECONFIGURABLE SEATING FOR A VESSEL

Abstract

Reconfigurable bench seating for a vessel includes a seatbase plate for a bench seat having a top surface and a lower surface, a swivel assembly secured to the lower surface of the seatbase plate, and a backrest for the bench seat having a first side and an opposing second side. The bench seating also includes a backrest folding assembly configured to fold the backrest between a mostly vertical orientation to a mostly horizontal orientation. The swivel assembly includes a swivel motor having a shaft, and an adapter coupled to the shaft, where the adapter is configured to be rotate in a first direction and an opposing second direction by the swivel motor. The backrest folding assembly comprises a linear actuator and a lever arm, where the lever arm is configured to be rotated in a first direction and an opposing second direction by the linear actuator.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application claims the benefit of U.S. provisional application No. 63/553,437 filed Feb. 14, 2024, which is hereby incorporated herein in its entirety by reference.

FIELD

[0002] The present invention relates to the field of boating, and, more particularly, to reconfigurable seating for a vessel.

BACKGROUND

[0003] Seating on a vessel includes different seating arrangements on the deck or in the cockpit area of the vessel. The seating may include bench seating, which is often long, cushioned seats to accommodate multiple people comfortably. They can be fixed, or movable depending on the design of the vessel and are usually positioned to provide a good view of the surroundings while motoring or anchored. Bench seating adds both functionality and comfort to the outdoor living space of the vessel, allowing passengers to relax and enjoy the views while cruising.

[0004] However, bench seating is not adjustable other than the backrest may be flipped to one side or the other to accommodate forward facing or rear facing positions. Accordingly, there is a need in the art for bench seating that is easily adjustable to accommodate more configurations of the seating area on the vessel.

SUMMARY

[0005] In view of the foregoing background, it is therefore an object of the present invention to provide improved bench seating for a vessel. The reconfigurable bench seating for a vessel of the present invention includes a seatbase plate for a bench seat having a top surface and a lower surface, a swivel assembly secured to the lower surface of the seatbase plate, and a backrest for the bench seat having a first side and an opposing second side. The reconfigurable bench seating also includes at least one backrest folding assembly secured to a first side of the backrest, where the at least one backrest folding assembly is configured to fold the backrest between a mostly vertical orientation to a mostly horizontal orientation. The bench seating may be configured for at least two passengers to sit side by side.

[0006] The swivel assembly includes a swivel motor having a shaft, and an adapter coupled to the shaft, where the adapter is configured to be rotate in a first direction and an opposing second direction by the swivel motor. The swivel assembly also includes a slewing ring coupled to the adapter and the seat, where the seat is configured to rotate in a first direction when the adapter moves in the first direction to swivel the seat to a forward facing orientation, and to rotate in an opposing second direction when the adapter moves in the opposing second direction to swivel the seat to a rearward facing orientation.

[0007] The backrest folding assembly includes a linear actuator and a lever arm, where the lever arm is configured to be rotated in a first direction and an opposing second direction by the linear actuator. The backrest folding assembly also includes a backrest bracket coupled to the lever arm and a backrest, where the lever arm is configured to rotate in the first direction when the linear

actuator moves in the first linear direction to fold the backrest down to the mostly horizontal position, and to rotate in an opposing second direction when the linear actuator moves in the opposing second linear direction to unfold the backrest to the mostly vertical position. The backrest folding assembly may have a first backrest.

[0008] The backrest folding assembly may comprise two assemblies. For example, a first backrest folding assembly may be secured to the first side of the backrest, and a second backrest folding assembly may be secured to the second side of the backrest, where the first and second backrest folding assemblies are configured to cooperate to move the backrest.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The aspects and the attendant advantages of the embodiments described herein will become more readily apparent by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

[0010] FIG. **1** is a perspective view of reconfigurable bench seating for a vessel in which various aspects of the disclosure may be implemented;

[0011] FIG. **2** is a perspective view of the reconfigurable bench seating in a rearward facing position;

[0012] FIG. **3** is a perspective view of the reconfigurable bench seating with the backrests folded down;

[0013] FIG. **4** is a perspective view of the reconfigurable bench seating with helm seating swiveled in a rearward facing position and the bench seating in a forward facing configuration;

[0014] FIG. **5** is a top perspective view of a carriage for a first embodiment of a swivel assembly of the reconfigurable bench seating;

[0015] FIG. **6** is a bottom perspective view of the carriage for the swivel assembly;

[0016] FIG. **7** is an exploded view of a pinion and slewing ring;

[0017] FIG. **8** is an exploded view of the slewing ring being secured to a seat base;

[0018] FIG. **9** is an exploded view of the first embodiment of the swivel assembly;

[0019] FIG. **10** is a bottom perspective view of the swivel assembly;

[0020] FIG. **11** is a top perspective view of the swivel assembly;

[0021] FIG. **12** is a perspective view of a first embodiment of a backrest folding assembly;

[0022] FIG. **13** is an exploded view of the first embodiment of the swivel assembly and the backrest folding assemblies;

[0023] FIG. **14** is a perspective view of a final assembly of the first embodiment of the reconfigurable seating for a vessel;

[0024] FIG. **15** is top view of a port and starboard side base plates;

[0025] FIG. **16** is an assembly of a slewing ring being coupled to the base plate;

[0026] FIG. **17** is a perspective view of a swivel motor of a second embodiment of a swivel assembly of the reconfigurable bench seating;

[0027] FIG. **18** is a top perspective view of the swivel motor attached to the base plate;

[0028] FIG. **19** is an exploded view of the second embodiment of the swivel assembly;

[0029] FIG. **20** is a bottom perspective view of the second embodiment of the swivel assembly secured to the base plate;

[0030] FIG. **21** is a top perspective view of the second embodiment of the swivel assemble secured to the base plate;

[0031] FIG. **22** is a perspective view of a second embodiment of a backrest folding assembly;

[0032] FIG. **23** is an exploded view of the second embodiment of the swivel assembly and the backrest folding assemblies; and

[0033] FIG. **24** is a perspective view of a final assembly of the second embodiment of the reconfigurable seating for a vessel.

DETAILED DESCRIPTION

[0034] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0035] Referring now to FIGS. **1-14**, a first embodiment of a reconfigurable bench seating for a vessel is depicted and generally designated **100**. The bench seating **100** is shown in a forward facing orientation of the vessel **10** in FIG. **1** and mounted to a support base **12**. The bench seating **100** is shown in the rearward facing orientation in FIG. **2** after being swiveled around using the present invention. As those of ordinary skill in the art can appreciate, the present invention can be implemented with any seating such as a helm seat or passenger seat, for example, and is not limited to the bench seating.

[0036] As described in more detail below, the seating **100** can move between forward facing and rearward facing, and also the backrest can be folded down using the present invention. For example, the backrests of the seating **100** are folded down in FIG. **3**. The backrests can then serve as counter space rather than for seating.

[0037] In FIG. **4**, two of the front seats **102** have been swiveled to be rearward facing to create face to face conversation between the passengers. Accordingly, the present invention can be used with bench seating as shown in FIGS. **1-3**, and also passenger and helm seating as shown in FIG. **4**.

[0038] Referring now to FIGS. **5** and **6**, various components of a rack assembly **130** of the reconfigurable bench seating **100** are depicted. The rack assembly **130** includes a carriage **122** having a planar support **104**. A rack **128** and slides **129** are mounted to an upper surface of the planar support **104**. The carriage **122** is secured to a pair of rails **108** mounted to a lower base plate **126** using the slides **129** as depicted in FIG. **6**.

[0039] A first actuator bracket **127** is secured to the lower base plate **126** and a second actuator bracket **124** is secured to a lower surface of the planar support **104**. The carriage **122** slidingly engages with the pair of rails **108** using the slides **129** so that the carriage **122** can slide in a first linear direction and an opposing second linear direction to initiate the swivel motion of the seating as described in more detail below.

[0040] Referring now to FIGS. **7** and **8**, the various components of a pinion assembly **114** of the swivel assembly are depicted. The pinion assembly **114** includes a lower pinion assembly **112** and a slewing ring **116**. The lower pinion **112** assembly includes a pinion **106** that is configured to be driven by the rack **128**. The slewing ring **116** is configured to be secured to a seat adapter **118**.

[0041] For example, the lower pinion assembly **112** is inserted through an aperture **125** within an upper base plate **121** as depicted in FIG. **8**. The pinion **106** extends through the aperture **125** and the slewing ring **116** is secured to the upper base plate **121**. A seat adapter **118** is secured to a top of the slewing ring **116**. The slewing ring **116** allows for rotational movement of the seat adapter **118** and seating secured thereto as the pinion **106** rotates.

[0042] An exploded view of the pinion assembly **120** is depicted in FIG. **9**. The pinion assembly **120** and the rack assembly **130** are aligned with the pinion assembly **120** being above the rack assembly **130**. The pinion **106** is inserted through lower aperture **134** in order to engage the rack **128**. The pinion assembly **120** and the rack assembly **130** are secured together and have spacers **134** separating the upper base plate **121** and the lower base plate **126**.

[0043] A bottom perspective view of the assembled swivel assembly **140** is depicted in FIG. **10** where the pinion **106** is visible through aperture **134** to engage the rack **128**. FIG. **11** is a top perspective view of the swivel assembly **140** where the seat adapter **118** is depicted for securing to

seating.
[0044] An actuator motor **132** is secured to the lower base plate **126** using the first actuator bracket **127**. An actuator arm **125** extends from the actuator motor **132** and is coupled to the planar support **104** of the carriage **122**. Accordingly, as the actuator arm **136** is extended or retracted, the rack **128** engages the pinion **106** to rotate, which in turn rotates the seat adapter **118**.
[0045] Referring now to FIG. **12**, a backrest folding assembly **160** of the reconfigurable bench seating **100** is depicted. The folding assembly **160** is positioned on each side of the seating and serves as an armrest. The folding assembly **150** uses a rack and pinion arrangement similar to the swivel assembly **140** described above.
[0046] The backrest folding assembly **150** includes an armrest panel **152** having an actuator motor **154** mounted thereto. An actuator arm **156** extends from the linear actuator **154** and is coupled to a sliding bracket **158**. The sliding bracket **158** is slidingly engaged with a rail **160** that is mounted to the armrest panel **152**. In addition, an armrest rack **162** is coupled to the sliding bracket **158**. Accordingly, as the actuator arm **156** is extended or retracted, the armrest rack **162** moves linearly to rotate a pinion **164**. The pinion **164** is secured to the armrest panel **152** using a bearing **165** that passes through the armrest panel **152** from one side to the other to couple to a backrest bracket **166** attached to the backrest **170**.
[0047] Accordingly, as the actuator arm **156** moves the sliding bracket **158** in a first linear direction, the rack **162** rotates the pinion **164** in a first direction, which in turn moves the backrest **170** to a folded down mostly horizontal position. Similarly, as the actuator arm **156** moves in an opposing second linear direction, the pinion **164** is rotated in a second opposing direction, which in turn moves the backrest **170** to a mostly vertical position.
[0048] Referring now to FIG. **13**, an exploded view of the swivel assembly **140** and the folding assembly **150** of the reconfigurable seating **100** is depicted. The seating **100** includes a seatbase plate **167** and a pair of bottom supports **168** positioned proximate to each end of the seatbase plate **167**. In addition, a sliding mechanism **145** may be secured between the seat adapter **118** and the lower surface of the seatplate base **167**. The sliding mechanism **145** is configured for the seatbase plate **167** (and seating) to slide forward or backward for adjustment relative to the support bases **12** of the vessel **10**. The folding assemblies **150** are secured to an upper surface of each end of the seatbase plate **167**, and the swivel assembly **140** is secured to a lower surface of the seatbase plate **167**.
[0049] The backrest brackets **166** have a first end secured to the backrest **170**, and a second end coupled to the bearing **165** as depicted in FIG. **14**. Accordingly, as the pinion **164** is rotated, the backrest brackets **166** are also rotated, which in turn causes the backrest **170** to move in the corresponding direction.
[0050] In operation of the reconfigurable bench seating **100**, the motion of the swivel assembly **140** is initiated by the actuator **132**. The actuator **132** selectively extends or retracts the actuator arm **136**, which in turn causes linear motion of the carriage **104** that carries the rack **128**. The movement of the rack **128** engages the pinion **106** to cause the seating to rotate to a forward facing orientation, or to rotate in an opposing rearward facing direction.
[0051] The backrest folding assemblies **150** cause the backrest **170** to move when the actuator **154** moves the sliding bracket **158** in the first linear direction to rotate the pinion **164** to fold the backrest down to the mostly horizontal position. Similarly, when the actuator **154** moves the sliding bracket **158** in the opposing second linear direction, the pinion **164** rotates in a second opposite direction to unfold the backrest **170** to the mostly vertical position.
[0052] Referring now to FIGS. **15-24**, a second embodiment of a reconfigurable bench seating for a vessel is depicted and generally designated **200**. Similar to the first embodiment described above, a base plate **121** is used and includes an aperture **125** for the slewing ring **116** to be secured as shown in FIGS. **15** and **16**.
[0053] In the second embodiment, a swivel motor **202** is used to drive a motor shaft **206** as

depicted in FIG. **17**. The motor shaft **206** is coupled to an adapter **204** and secured with a set screw **205**. Referring now to FIG. **18**, the swivel motor **202** is shown secured to a bottom surface of the base plate **121** using a motor mount **208**, and the adapter **204** is secured to the slewing ring **116**. A locking bracket **210** is also secured to a top surface of the base plate.

[0054] An exploded view of the swivel assembly **220** is depicted in FIG. **19**. A bracket **212** along with a motor mount **208** are used to position the swivel motor **202** and shaft **2026** on the bottom surface of the base plate **121**. A pair of spacers **134** may be positioned between the motor mount **208** and the base plate **121**. As explained above, the adapter **204** is secured to the motor shaft **206**, which in turn is secured to the slewing ring **116**. The slewing ring **116** is secured to the aperture **125** of the base plate **121**, and to a seat support **218**.

[0055] A bottom perspective view of the swivel assembly **220** is depicted in FIG. **20**. The bracket **212** and motor mount **208** are secured to the bottom surface of the base plate **121**. Now turning to FIG. **21**, the swivel assembly **220** is shown assembled with the seat support **218**. The adapter **204** is visible though the aperture of the seat adapter **204**. Accordingly, as the adapter **204** is rotated by the swivel motor **202** and shaft **206**, the seat support **218** (and seat) is rotated.

[0056] Referring now to FIG. **22**, a backrest folding assembly **260** of the second embodiment of the reconfigurable bench seating **200** is depicted. The folding assembly **250** is positioned on each side of the seating **167** and serves as an armrest. The folding assembly **250** uses a linear actuator **154** and a lever arm **252** to control movement of the backrest **170** as described in detail below.

[0057] The backrest folding assembly **260** of the second embodiment includes an armrest panel **152** having the linear actuator **154** mounted thereto. An actuator arm **156** extends from the linear actuator **154** and is coupled to a lever arm **252**. The lever arm **252** is coupled to a lever arm adapter **256** on an outer side of the armrest panel **152** as depicted in FIG. **23**. The lever arm **252** is coupled to the backrest bracket **166** on an inner side of the armrest panel **152**. Accordingly, as the actuator arm **156** is extended or retracted, the lever arm **252** is rotated, which rotates the backrest bracket and the backrest **170**. For example, as the actuator arm **156** rotates the lever arm **252** in a first direction, the backrest **170** is moved to a folded down mostly horizontal position. Similarly, as the actuator arm **156** moves in an opposing second linear direction, the lever arm **252** is rotated in a second opposing direction, which in turn moves the backrest **170** to a mostly vertical position.

[0058] Referring now to FIG. **24**, in operation of the second embodiment of the reconfigurable bench seating **200**, the motion of the swivel assembly **220** is initiated by the swivel motor **202**. The rotating of the motor shaft **206** and adapter **204** causes the seating to rotate to a forward facing orientation, or to rotate in an opposing rearward facing direction.

[0059] The backrest folding assemblies **250** cause the backrest **170** to move when the actuator **154** rotates the lever arm **252** in the first direction to fold the backrest down to the mostly horizontal position. Similarly, when the actuator **154** rotates the lever arm **252** in the opposing second linear direction, the lever arm **252** rotates in a second opposite direction to unfold the backrest **170** to the mostly vertical position.

[0060] Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are intended to be included within the scope of the appended claims.

Claims

1. Reconfigurable bench seating for a vessel comprising: a seatbase plate for a seat having a top surface and a lower surface; a swivel assembly secured to the lower surface of the seatbase plate; a backrest for the seat having a first side and an opposing second side; and at least one backrest folding assembly secured to a first side of the backrest, wherein the at least one backrest folding

assembly is configured to fold the backrest between a mostly vertical orientation to a mostly horizontal orientation.

2. The reconfigurable bench seating of claim 1, wherein the seat is configured for at least two passengers to sit side by side.

3. The reconfigurable bench seating of claim 2, wherein the swivel assembly comprises a swivel motor having a shaft, and an adapter coupled to the shaft, wherein the adapter is configured to be rotate in a first direction and an opposing second direction by the swivel motor.

4. The reconfigurable bench seating of claim 3, wherein the swivel assembly further comprises a slewing ring coupled to the adapter and the seat, wherein the seat is configured to rotate in a first direction when the adapter moves in the first direction to swivel the seat to a forward facing orientation, and to rotate in an opposing second direction when the adapter moves in the opposing second direction to swivel the seat to a rearward facing orientation.

5. The reconfigurable bench seating of claim 4, wherein the at least one backrest folding assembly comprises a linear actuator and a lever arm, the lever arm is configured to be rotated in a first direction and an opposing second direction by the linear actuator.

6. The reconfigurable bench seating of claim 5, wherein the at least one backrest folding assembly further comprises a backrest bracket coupled to the lever arm and a backrest, wherein the lever arm is configured to rotate in the first direction when the linear actuator moves in the first linear direction to fold the backrest down to the mostly horizontal position, and to rotate in an opposing second direction when the linear actuator moves in the opposing second linear direction to unfold the backrest to the mostly vertical position.

7. The reconfigurable bench seating of claim 6, wherein the at least one backrest folding assembly comprises a first backrest folding assembly secured to the first side of the backrest, and a second backrest folding assembly secured to the second side of the backrest, wherein the first and second backrest folding assemblies are configured to cooperate to move the backrest.

8. Reconfigurable bench seating for a vessel comprising: a seatbase plate for a seat having a top surface and a lower surface; a swivel assembly secured to the lower surface of the seatbase plate, the swivel assembly comprising, a swivel motor, a seat adapter coupled to the seat, wherein the seat adapter is configured to be rotated in a first direction and an opposing second direction by the swivel motor, wherein the seat adapter is configured to rotate in the first direction to swivel the bench seat to a forward facing orientation, and to rotate in the opposing second direction to swivel the bench seat to a rearward facing orientation.

9. The reconfigurable bench seating of claim 8, wherein the swivel assembly comprises a slewing ring coupled to the seat adapter.

10. The reconfigurable bench seating of claim 9, wherein the slewing ring is mounted to an aperture of the seatbase plate.

11. The reconfigurable bench seating of claim 10, wherein the swivel motor is mounted to a lower surface of the seatbase plate.

12. The reconfigurable bench seating of claim 11, wherein the swivel motor comprises a shaft coupled to the seat adapter.

13. The reconfigurable bench seating of claim 12, wherein the seat adapter comprises a circular shape having a central aperture for receiving the shaft.

14. The reconfigurable bench seating of claim 13, further comprising a seat support coupled to the seat adapter.

15. The reconfigurable bench seating of claim 14, further comprising a seat coupled to the seat support.

16. Reconfigurable seating for a vessel comprising: at least one seat mounting base secured to deck of the vessel; seating mounted to the at least one seat mounting base and the seating having a seating surface and a backrest; and a swivel assembly positioned between the seat mounting base and the seating and configured for the seating to swivel between a forward facing position and a

rearward facing position.

17. The reconfigurable seating of claim 16, further comprising at least one backrest folding assembly secured to the backrest, wherein the at least one backrest folding assembly is configured to fold the backrest between a mostly vertical orientation to a mostly horizontal orientation.

18. The reconfigurable bench seating of claim 16, wherein the swivel assembly comprises a swivel motor having a shaft, the shaft is configured to be rotated in a first direction and an opposing second direction by the swivel motor.

19. The reconfigurable bench seating of claim 18, wherein the swivel assembly further wherein the swivel assembly further comprises a an adapter and slewing ring coupled to the adapter and the seating, wherein the seating is configured to rotate in a first direction when the adapter moves in the first direction to swivel the seating to a forward facing orientation, and to rotate in an opposing second direction when the adapter moves in the opposing second direction to swivel the seating to a rearward facing orientation.

20. The reconfigurable bench seating of claim 17, wherein the at least one backrest folding assembly comprises a linear actuator and a lever arm, the lever arm is configured to be rotated in a first direction and an opposing second direction by the linear actuator.