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United States Patent	12390377
Kind Code	B2
Date of Patent	August 19, 2025
Inventor(s)	Alvarez; Eleanor et al.

Wheelchair

Abstract

A wheelchair having a seat assembly and a base assembly. The base assembly includes a central frame, rear wheels, and leg assemblies. The leg assemblies are movable between at least a first position and a second position, which enables the leg assemblies to be stowed away when not in use. The seat assembly includes a seat component, a backrest component, and opposing side structures. The backrest component is connected to, and pivotable about, the side structures such that it may be folded down for storage or reclined for more comfortable sitting. The side structures include adjustable armrest assemblies that enable vertical adjustments of the armrests.

Inventors: **Alvarez; Eleanor (Powell, OH), Alvarez; Emily (Sullivan's Island, SC), Hubert; Benjamin (Hackney, GB), Starkey; Mike (Kent, OH)**

Applicant: **Leaderstat, Ltd.** (Powell, OH)

Family ID: **1000008767160**

Assignee: **Leaderstat, Ltd. (Powell, OH)**

Appl. No.: **17/828909**

Filed: **May 31, 2022**

Prior Publication Data

Document Identifier	Publication Date
US 20220378633 A1	Dec. 01, 2022

Related U.S. Application Data

us-provisional-application US 63194712 20210528

Publication Classification

Int. Cl.: **A61G5/02** (20060101); **A61G5/08** (20060101); **A61G5/10** (20060101)

U.S. Cl.:

CPC **A61G5/0875** (20161101); **A61G5/1056** (20130101);

Field of Classification Search

CPC: A61G (5/128); A61G (5/08); A61G (5/1059); A61G (5/02); A61G (5/0875); A61G (5/1054); A61G (5/00); A61G (5/0891); A61G (5/10); A61G (5/107); A61G (5/1078); A61G (5/12); A61G (5/127); A61H (3/04); A61H (2203/043)

USPC: 280/650

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Primary Examiner: Shriver, II; James A

Assistant Examiner: Johns; Hilary L

Attorney, Agent or Firm: Standley Law Group LLP

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a nonprovisional patent application that makes a priority claim to U.S. Provisional Application No. 63/194,712, filed May 28, 2021, which is incorporated by reference in its entirety.

FIELD
(1) Embodiments of the present disclosure relate to mobility devices. More particularly, embodiments relate to wheelchairs that can be configured for a variety of users and purposes and can be easily transported and stored.

BACKGROUND

(2) Wheelchairs are commonly used by individuals with a wide range of mobility disabilities for the main purpose of indoor and/or outdoor locomotion. Wheelchairs may also be used by persons who are temporarily ill or convalescent. Persons who use wheelchairs may still benefit from, and be encouraged to, make use of their legs whenever possible. For example, it may be advised, and preferred by a wheelchair user, to use their feet, when possible, to propel their wheelchair, particularly for shorter distances. Such movement can help maintain muscle tone and stamina, especially for those persons who may spend a significant portion of the day in a wheelchair. Many wheelchairs are not adjustable and are intended to be used for a variety of persons regardless of their height, stature, or mobility. However, comfort and even health may be jeopardized by this conventional one-size-fits-all approach to wheelchairs. Persons who are too tall or too short for a particular wheelchair may experience discomfort, stiffness, and difficulty in moving themselves. Poor wheelchair fit may also have a negative impact on circulation. Moreover, elderly users of wheelchairs commonly suffer from skin tears from the rough surfaces, joints, and fixtures on chairs. Skin ulcers and other skin lesions are also common from being sedentary for too long in a wheelchair.

(3) Conventional wheelchairs are also difficult to transport and take up significant space in storage. Difficulty in transporting a wheelchair may reduce the ability of a user to visit others, attend to errands, or otherwise leave their primary residence.

(4) Accordingly, those skilled in the art continue with research and development efforts in the field of wheelchairs.

SUMMARY OF THE INVENTION

(5) Disclosed are wheelchairs that include a base assembly and a seat assembly.

(6) In one embodiment, the wheelchair includes a base assembly having a central frame that has a forward portion and a rear portion. The base assembly also includes a leg assembly having a leg and a caster wheel subassembly. The leg includes an elongated body that defines a top end and a bottom end. The caster wheel subassembly is connected to the bottom end of the leg. The base assembly also includes a connecting means for connecting the top end of the leg to the forward portion of the central frame. The connecting means provides for the movement of the leg between at least a first position and a second positioned. The location of the caster assembly wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position. The seat assembly is disposed above and connected to the central frame.

(7) In another embodiment, the wheelchair includes a base assembly having a central frame that has a forward portion and a rear portion. The base assembly also includes a leg assembly having a leg and a caster wheel subassembly. The leg includes an elongated body that defines a top end and a bottom end. The caster wheel subassembly is connected to the bottom end of the leg. The base assembly also includes a connecting means for connecting the top end of the leg to the forward portion of the central frame. The connecting means provides for the movement of the leg between at least a first position and a second positioned. The location of the caster assembly wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position. The seat assembly includes a seat component disposed above and connected to the central frame. The seat component includes a forward portion and a rear portion. The seat assembly further includes a first side structure and an opposing second side structure, with the first and second side structures being disposed near the rear portion of the seat component. The seat assembly further includes a backrest component disposed between the first side structure and the second side structure. The backrest component includes a top portion and a bottom portion. The seat assembly further includes a first trunnion joint and a second trunnion joint, wherein the first and second trunnion joints connect the bottom portion of the backrest component to the first side structure and the second side structure, respectively. The first trunnion joint and the second

trunnion joint enable the backrest to pivot between at least a first angular position and a second angular position. The top portion of the backrest component is closer to the seat component when the backrest component is in the first angular position than in the second angular position. The seat assembly further includes a latch mechanism configured to lock the backrest in at least one of the first angular position and the second angular position.

(8) In yet another embodiment, the wheelchair includes a base assembly having a central frame that has a forward portion and a rear portion. The base assembly also includes a leg assembly having a leg and a caster wheel subassembly. The leg includes an elongated body that defines a top end and a bottom end. The caster wheel subassembly is connected to the bottom end of the leg. The base assembly also includes a connecting means for connecting the top end of the leg to the forward portion of the central frame. The connecting means provides for the movement of the leg between at least a first position and a second positioned. The location of the caster assembly wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position. The seat assembly includes a seat component disposed above and connected to the central frame. The seat component comprising a forward portion and a rear portion. The seat assembly further includes a first side structure and an opposing second side structure, with the first and second side structures being disposed near the rear portion of the seat component. The seat component further includes a height-adjustable armrest assembly provided on the first side structure.

(9) Other examples of the disclosed [subject], and method of making the same, will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. **1** is a front perspective view of the wheelchair of the present disclosure;
(2) FIG. **2** is a rear perspective view of the wheelchair of FIG. **1**;
(3) FIG. **3** is a front elevation view of the wheelchair of FIG. **1**;
(4) FIG. **4** is a right-side elevation view of the wheelchair of FIG. **1**;
(5) FIG. **5** is a rear elevation view of the wheelchair of FIG. **1**;
(6) FIG. **6** is a top plan view of the wheelchair of FIG. **1**;
(7) FIG. **7** is a left-side elevation view of the wheelchair of FIG. **1**;
(8) FIG. **8** is a bottom plan view of the wheelchair of FIG. **1**;
(9) FIG. **9** is a front elevation view of the wheelchair of FIG. **1** with the backrest component folded downwards and a leg assembly turned inwards;
(10) FIG. **10** is a bottom perspective view of the wheelchair of FIG. **1** fully collapsed;
(11) FIG. **11** is a side elevation view of the wheelchair of FIG. **1** fully collapsed;
(12) FIG. **12** is a top perspective view of the base assembly of the wheelchair of FIG. **1**;
(13) FIG. **13** is a rear perspective view of the central frame of the base assembly of FIG. **6** in isolation;
(14) FIG. **14** is a front perspective view of the pair of rear wheels of the base assembly of FIG. **6** in isolation;
(15) FIG. **15** is a side perspective view of a pair of leg assemblies of the base assembly of FIG. **6** in isolation;
(16) FIG. **16** is a side perspective view of the brake assembly of the base assembly of FIG. **6**.
(17) FIG. **17** is a front perspective view of the seat assembly of the wheelchair of FIG. **1**;
(18) FIG. **18** is a rear perspective view of the seat assembly of FIG. **17**;
(19) FIG. **19** is a front perspective view of the seat assembly of FIG. **17** without cushioning,

upholstery, and paneling;
(20) FIG. **20** is a side elevation view of the seat assembly of FIG. **17** with the backrest in a standard position;
(21) FIG. **21** is a side elevation view of the seat assembly of FIG. **17** with the backrest in a first reclined position;
(22) FIG. **22** is a side elevation view of the seat assembly of FIG. **17** with the backrest in a second reclined position;
(23) FIG. **23** is a rear perspective view of the seat assembly of FIG. **19**;
(24) FIG. **24** is a close-up view of a portion the seat assembly of FIG. **23**;
(25) FIG. **25** is a side elevation view of a side structure of the wheelchair of FIG. **1**;
(26) FIG. **26** is the opposing side elevation view of the side structure of FIG. **25**;
(27) FIG. **27** is a cross-sectional view of the side structure of FIG. **25**;
(28) FIG. **28** is a front perspective view of an alternative embodiment of a front leg assembly;
(29) FIG. **29** is a top perspective view of a portion of the front leg assembly of FIG. **28**;
(30) FIG. **30** is a cross-sectional view of a portion of the front leg assembly of FIG. **29**;
(31) FIG. **31** is a side elevation view of a portion of the front leg assembly of FIG. **28**;
(32) FIG. **32** is a cross-sectional view of a portion of the front leg assembly of FIG. **31**;
(33) FIG. **33** is a front perspective view of an alternative embodiment of the wheelchair; and
(34) FIG. **34** is a close-up view of a portion of the wheelchair of FIG. **33**.

DETAILED DESCRIPTION

(35) The following detailed description refers to the accompanying drawings, which illustrate specific examples described by the disclosure. Other examples having different structures and operations do not depart from the scope of the present disclosure. Like reference numerals may refer to the same feature, element, or component in the different drawings.
(36) Illustrative, non-exhaustive examples, which may be, but are not necessarily, claimed, of the subject matter according the present disclosure are provided below. Reference herein to “example” means that one or more feature, structure, element, component, characteristic and/or operational step described in connection with the example is included in at least one embodiment and/or implementation of the subject matter according to the present disclosure. Thus, the phrase “an example” and similar language throughout the present disclosure may, but do not necessarily, refer to the same example. Further, the subject matter characterizing any one example may, but does not necessarily, include the subject matter characterizing any other example.
(37) Referring to FIGS. **1**-**8**, the present disclosure provides an exemplary embodiment of a wheelchair **10**. The wheelchair **10** is an assistive device for assisting individuals in moving from one location to another, particularly individuals who have limited mobility. The wheelchair **10** incorporates various adjustable features (e.g., armrests and footrests) that allow the wheelchair **10** to accommodate individuals (i.e., users) of varying sizes and heights, as well as aesthetic and comfort features (e.g., cushioning, upholstery, paneling) that make the wheelchair **10** attractive and comfortable to sit on. Moreover, the wheelchair **10** is also collapsible, capable of reducing its vertical height, which enables it to be more easily stored and transported.
(38) The wheelchair **10** includes a seat assembly **12** (best shown in FIGS. **17**-**18**) and a base assembly **14** (best shown in FIG. **12**). The seat assembly **12** provides a sitting surface **16** for an individual to sit in the wheelchair **10** and the base assembly **14** supports the seat assembly **12** from below. The seat assembly **12** generally includes a seat component **18**, a backrest component **20**, and opposing side structures **22**. The base assembly **14** generally includes a central frame **24**, front leg assemblies **26**, and rear wheels **28**. The collapsibility of the wheelchair **10** is attributable to various features, described in greater detail below, that enable backrest component **14** to fold down towards the seat component **12** and for front leg assemblies **26** to turn inwards towards the central frame **24** (FIGS. **9**-**11**).
(39) Referring to FIG. **13**, an exemplary embodiment of a central frame **24** is shown. This central

frame **24** includes a rear crossbar **30** and a front crossbar **32** connected by two longitudinal members **34**. The two longitudinal members **34** are connected to the opposing ends of the front crossbar **32** but are oriented inwards towards the back such they meet the rear crossbar **30** near its center. By this design, the front leg assemblies **26**, which are attached to the front ends of the longitudinal members **34**, flare outwards towards the front (FIG. **12**) which provides for greater leg space for an individual sitting in the wheelchair **10**.

(40) To support the seat assembly **12**, the front crossbar **32** includes a raised center portion that directly contacts the bottom side of the seat component **18**. This supports the front of the seat compartment **18** from below, and brackets **36** provide for secure attachment between the two. Towards the rear, the rear crossbar **30** is disposed lower than the front crossbar **32** and does not contact the seat component **18** directly (FIG. **11**). Rather, the rear crossbar **30** supports the rear of the seat component **18** via suspension members **38** (e.g., "shocks"), which are provided to dampen vibrations and/or impact forces experienced by the wheelchair **10** thereby making the wheelchair **10** more comfortable to ride in. These linear suspension members **38** are connected to the rear crossbar **30** at one end while connected to the seat component **18** at the other end.

(41) Those skilled in the art will appreciate that while the central frame **24** of FIG. **7** is considered exemplary, it is not meant to be limiting. It is contemplated that central frames with different configurations of structural members may be utilized as well. For example, the longitudinal members may be oriented parallel to one another. In another example, suspension members may also be provided on the front cross bar. In yet another example, the rear crossbar may include a raised center portion like the front cross bar. Differences such as these will not result in a departure from the scope of the present disclosure.

(42) Referring to FIGS. **13** and **14**, the central frame **24** includes rear wheel axle sockets **40** for receiving axle pins **42** as a way of connecting the hub **44** of a rear wheel **28** to the central frame **24**. As in the embodiment shown, the rear wheel sockets **40** may be incorporated into the opposing ends of the rear crossbar **30**. In one or more embodiments, the axle pins **42** may be integrated onto the hubs **44** of the rear wheels **28** directly. This socket-and-axle-pin connection enables the attachment and free rotational movement of the rear wheels **28**. Ideally, the socket-and-axle-pin connection would also provide for easy detachment and reattachment of the rear wheels **28** (e.g., via a quick release mechanism).

(43) Referring to FIG. **34**, depicted is an alternative embodiment of the rear crossbar **46** that further includes side portions **48** that extend downwards from the horizontal dimension of the rear crossbar **46** (one side being shown). Provided on these side portions **48** are a plurality of vertically aligned rear wheel sockets (three being shown) that allow the rear wheels **28** to be attached at various vertical positions. In effect, this enables the vertical height of the seat assembly **12** to be adjusted as desired. For example, attaching a rear wheel **28** to the lowest socket **50** enables an individual to ride relatively high above the ground, whereas attaching a rear wheel **28** to the uppermost socket **52** enables an individual to ride relatively low to the ground.

(44) As shown, each of the rear wheels **28** may comprise a push rim **54** (or "hand rim") located around an outer circumference of each rear wheel **28**. The push rim **54** may provide a user with a surface to grab and induce rotation of the rear wheels **28** while the user is sitting in the wheelchair **10**.

(45) Towards the front of the central frame **24**, the base assembly **14** includes two leg assemblies **26** (FIG. **15**). The leg assemblies **26** each include a leg **56**, a caster wheel subassembly **58**, and a footrest subassembly **60**. As used herein, the term "caster wheel subassembly" refers to a caster wheel and a bracket for retaining the caster wheel and attaching it to a leg. As used herein, the term "footrest subassembly" refers to a footrest and a front rigging for retaining the footrest and attaching it to a leg. Ideally, the front rigging of a footrest subassembly would provide for vertical adjustment of a footrest to accommodate individuals of varying heights.

(46) A leg **56** of a front leg assembly **26** may include an elongated body that defines a bottom end

64 and a top end **66**. The bottom end **64** may be attached to a caster wheel subassembly **58**, such as the clevis-type bracket **68** and caster wheel **70** that is shown. A footrest subassembly **60** may include a front rigging **72** having a bottom piece **74** and a top piece **76**. The bottom piece **74** may be connected to, and thereby support, the footrest **78** (e.g., by a forward prong that is inserted into the footrest). Ideally, the connection between the footrest **78** and the bottom piece **74** would enable the footrest **78** to pivot around the bottom piece **74** so that an individual can turn it downwards to be used (FIG. **15**) and upwards to put it away (FIG. **9**). The top piece **76** includes a collar portion **80** that is coaxially received over the leg **62**. Ideally, the collar portion **80** may enable the footrest subassembly **60** to pivot around the leg **62** so that the entire footrest subassembly **60** can be turned inwards to be stowed (FIG. **9**) and outwards to be used (FIG. **15**). The bottom piece **74** front rigging **72** may be inserted into the top piece **76** and secured in place by height adjustment mechanism **82**. Height adjustment mechanism **82** may include a push-button **84** provided on the bottom piece **74** and a series of holes **86** defined in the top piece **76**, or vice versa. The push-button **84** may be biased (e.g., by an internal spring) outwards so that it enters one of the holes **86** to thereby restrict telescopic movement.

(47) The base assembly **14** includes at least one connecting means for connecting the central frame **24** to the top end of a leg **62**. Ideally, a connecting means would provide for the free movement of a leg assembly **26** between at least a first position and a second position, wherein the caster wheel subassembly **58** is located further away from the central frame **24** when the leg assembly **26** is in the first position than when it is in the second position.

(48) Referring to FIGS. **12**, **15**, and **16**, an exemplary embodiment of a connecting means **88** is shown. This connecting means **88** includes shaft **90**, which is connected to the top end **66** of a leg **62**, and a receiving channel **92**, which is defined in the central frame **24** (in this case, defined in longitudinal member **34**). By inserting the shaft **90** into the receiving channel **92**, the leg assembly **26** can be connected to the central frame **24**. Further, this connecting means **88** may also include hirth joint **94** and latch mechanism **96**. The hirth joint **94** includes a first hirth coupling **98** and a corresponding second hirth coupling **100**. The first hirth coupling **98** may be coaxially received over the shaft **90** and a second hirth coupling **100** may be connected to the central frame **24**. The hirth joint **94** can thereby lock the shaft **90** at a particular angular orientation (and thus, the overall leg assembly **26**) relative to the receiving channel **92** when the first and second hirth couplings **98**, **100** are coupled together. The latch mechanism **96** includes a plunger pin **102**, a through-hole **104** defined in the central frame **24** (FIG. **13**) that extends into the receiving channel **92**, and a receiving hole **106** defined in the shaft **90** (FIG. **15**). By inserting the plunger pin **102** through the through-hole **104** and into the receiving hole **106**, the latch mechanism **96** can thereby prevent telescopic movement of the shaft **90** relative to the receiving channel **92**. Ideally, the shaft **90** may also define multiple receiving holes **106** at different angular positions about the shaft **90** so that the latch mechanism **96** can further lock the shaft **90** at different angular positions. Moreover, the latch mechanism **96** may also include a spring that biases the plunger pin **102** towards a receiving hole **106** and/or through it. It is contemplated that such a spring may be incorporated, for example, within the plunger pin **102** itself (e.g., within the bulb-shaped handle), or alternatively within the receiving cavity or within the shaft.

(49) In operation, a plunger pin **102** may be pulled to retract the plunger pin **102** from at least one of the receiving hole **106** and the through-hole **104**. Doing so frees the shaft **90** and enables telescopic movement between the shaft **90** and the receiving channel **92**. From there, the shaft **90** can be pulled in the forward direction to decouple the hirth couplings **98**, **100** of the hirth joint **94**. This enables free rotation of the shaft **90** (and by extension, the entire leg assembly **26**) about the receiving channel **92**. The leg assembly **26** can then be rotated into a desired orientation (e.g., FIGS. **1**, **9**, and **10**). Once in a desired orientation, the shaft **90** can be pushed back into the receiving channel **92** until the hirth couplings **98**, **100** are coupled once again and the plunger pin **102** is reinserted into a receiving hole **106**, thereby locking the leg assembly **26** into the desired

orientation.
(50) FIG. **16** shows an exemplary embodiment of a brake assembly **108** which may be present on either side of the wheelchair **10**. The brake assembly **108** is comprised in part of a spacer **110**, brake bar **112**, and the lever **114**. The spacer **110** allows the brake bar **112** and the lever **114** to be spaced from the central frame **24**. The brake bar **112** is designed to make contact with the rear wheel **28** and induce sufficient friction to cause the rear wheel **28** to slow or cease rotation. Full engagement of the brake assembly **108** may also prevent a stationary wheelchair **10** from moving. This may be a particularly important safety measure if the wheelchair **10** is on a sloped surface. As shown, the spacer **110** may be incorporated into the latch mechanism **96** of the connecting means **88** described above, with the plunger pin **102** extending through spacer **110**.
(51) Referring to FIG. **28**, depicted is an alternative exemplary embodiment of a front leg assembly **116**. This front leg assembly **116** is connected to a central frame **118** that includes a forward end **120** that curves downward. Here, the top piece **122** of the front rigging **124** includes a latch mechanism **126** featuring a plunger pin **128** extending through a through-hole **130** in the collar portion **132** and is received within a receiving hole **134** defined in the leg **136** (FIGS. **29** and **30**). This plunger pin **128** locks the position of the front rigging **124** to prevent it from pivoting around the leg **136**, and may be retracted from the receiving hole **134** to release it.
(52) Referring to FIGS. **28**, **31**, **32**, and **33**, depicted is a second exemplary embodiment of a connecting means **138**. Here, the connecting means **138** includes sliding bolt lock **140** and hinge **142**. The hinge **142** connects the forward end **120** of the central frame **118** to the top end **144** of the leg **136**, and enables the leg **136** to pivot backwards under the central frame **118** when the sliding bolt lock **140** is not engaged (that is to say, move between at least a first position (FIG. **22**) and a second position (FIG. **27**)). The sliding bolt lock **140** is incorporated into the top end **144** of the leg **136** and includes bolt **146**, handle **148**, and spring **150**. When the leg **136** is in the first position, the spring **150** may bias the bolt **146** upwards such that a portion of the bolt **146** enters a receiving channel **152** defined in the forward end **120** of the central frame **118** to lock the leg **136** in place. To release the leg **136**, the handle **148** (which is connected to the bolt **146** and extends through a slot **150** defined in the leg **136**) may be engaged to compress the spring **150** and retract the bolt **146** from the forward end of the central frame **118**.
(53) The connecting means of FIGS. **12**, **15**, and **16**, and of FIGS. **28**, **31**, **32**, and **33** notwithstanding, it is contemplated that various other connecting means may be employed without departing from the scope of the present disclosure.
(54) Depicted in FIGS. **17-18** is an exemplary embodiment of a seat assembly **12**. The seat assembly includes seat component **18**, backrest component **20**, and opposing side structures **22**. Each of these may include, either individually or in combination, various paneling, padding, cushioning, upholstery, and the like to make the wheelchair **10** more aesthetically pleasing and/or comfortable to sit on. These aesthetic and/or comfort features are not limited to any particular embodiment, and may vary without departing from the scope of the present disclosure. In the embodiment shown, both the backrest component **20** and the seat component **18** include cushioning and upholstery on the sitting-side of the wheelchair (ref. nos. **154**, **156**). Further, paneling is provided on the opposing side structures (ref. no. **158**), the rear side of the backrest component (ref. no. **160**), and the underside of the seat component (ref. no. **162**).
(55) FIG. **13** depicts the seat assembly **12** with the cushioning, upholstery, and paneling removed. Here, it is shown that the backrest component **14** and the seat component **12** can each further include a frame **164**, **166** for their respective cushioning, upholstery, and paneling to be attached to. These frames **164**, **166** may impart rigidity to their respective components, and may enable these components **12**, **14** to be connected to the opposing side structures **22**. In the embodiment shown, the frames **164**, **166** both include a curved, outer structural member **168**, **170** and number of crossbars **172**, **174** (one in the seat component and two in the backrest component) connected to them. Ideally, the crossbars **174** in the backrest component **14** may be curved or bent towards the

rear to provide for a more ergonomic resting position for an individual's back.
(56) As FIGS. **17-19** show, the cushioning, upholstery, and paneling of the backrest component may not cover/encompasses the entirety of the backrest component frame **164**. Rather, the uppermost portion **165** of the outer structural member **170** of the backrest component frame **164** may remain uncovered and may protrude outwards from the rear of the backrest component **20** to function as a push-bar for maneuvering the wheelchair. However, those skilled in the art would appreciate that this design is not meant to be limiting. It is contemplated that in other embodiments, the frame **164** of the backrest component **20** may be entirely covered by aesthetic and/or comfort features, and that dedicated maneuvering features (e.g., handles and the like) may be incorporated as well (either in addition to or as an alternative for the push-bar of the present embodiment).
(57) Referring to FIGS. **25** and **25**, the opposing side structures may include a bracket **171** and an armrest **173**. The bracket **171** serves to secure the seat component **18** and the backrest component **20**, and may feature any suitable design for doing so. Here, the bracket **171** features a generally curved, “J” shaped design with an elongated lower portion **175** for securing the seat component **18** and a wider upper portion **177** for securing the backrest component **20**. Holes **179** provided on the bracket **171** may be used to interface with mechanical fasteners. The armrest **173** is attached to the bracket **171** and extends forward to provide a surface for an individual to rest his/her arm on. It is contemplated that a variety of armrest types may be utilized here, including fixed non-adjustable armrests and/or adjustable armrest assemblies **202** like that which is shown.
(58) The opposing side structures **22** may be disposed near, and connected to, the rear of the seat component **18**, and may extend vertically above the seat component **18**. The backrest component **20** may be disposed in-between the opposing side structures **22**. The bottom portion **176** of the backrest component **20** may be connected to the opposing side structures **22** by way of trunnion joints **178** (FIG. **19**). In the embodiment shown, both trunnion joins **178** include a connecting pin inserted through a through-holes in the internal frame **166** of the backrest component **20** and received in a receiving hole defined in a side structure **22**. It is contemplated that both connecting pins should be aligned on a common axis so that the overall backrest component **20** can freely pivot about the trunnion joints **178**, thereby enabling the backrest component **20** to fold downwards towards the seat component **18** (FIG. **3-5**), extend backwards to recline (FIGS. **15** and **16**), and/or assume in any angular position (i.e., orientation) therebetween (FIG. **14**). It is contemplated that the ability of recline further enhances the user experience of the wheelchair **10** by making it more comfortable to in, particularly for long periods of time.
(59) Referring to FIGS. **18**, **23**, and **24** the seat assembly **12** may also include a latch mechanism for locking the backrest component **20** into a particular angular position. In the embodiment shown, the seat assembly **12** includes a latch mechanism **186** incorporated into the backrest component **20**. The latch mechanism **186** includes a pull handle **188** connected to the center portion of a drawstring **190**. The ends of the drawstring are both connected to pins **192** that are housed within opposing channels **194** defined in the frame **166** of the backrest component **20**. Both of these pins **192** are biased towards a side structure **22** by a spring **195** and may be received within a receiving hole **196** defined in the inside surfaces **198** of those side structures **22** (which prevents the backrest component **20** from pivoting) (best shown in FIG. **26**). In operation, pulling the pull handle **188** causes the drawstring **190** to retract the pins **192** from their respective receiving holes **196** which thereby releases the backrest component **20** and allows it to pivot. Ideally, a side structure **22** would define a plurality of receiving holes **196** angularly displaced from one another relative to the trunnion joints **178**, thereby enabling the backrest component **20** to be locked into multiple angular positions.
(60) While the latch assembly **186** shown in FIGS. **12**, **17**, and **18** is exemplary, it is not meant to be limiting. It is contemplated that other types of latch mechanisms may be employed (e.g., sliding bolt locks).
(61) Referring to FIGS. **25-27**, the armrests may be connected to the outside surface **200** of a side

structure bracket **171**. These armrests may include any suitable configuration of aesthetic and/or comfort features such as paneling, padding, cushioning, upholstery, and/or like. In the embodiment shown, the armrests are adjustable armrest assembles **202** that can be either raised or lowered. These adjustable armrests assemblies **202** include a mounting bracket **204** and an indexing member **206** connected to an armrest **208**. The indexing member **206** is inserted into, and permitted to slide within, the mounting bracket **204**. Further, the adjustable armrest assemblies **202** include a latch mechanism **209** that includes a "Z" lever **210** configured to lock the indexing member **206** into a particular vertical position. As shown, the lever includes a handle portion **212**, a latch portion **214**, and a center portion **216** disposed therebetween. The center portion **216** is biased towards the side structure **22** by a spring **218** which causes the latch portion **214** to be inserted into a slot **220** defined in the side structure **22**, thereby locking the armrest **208** at a particular height. In operation, the handle portion **212** may be pulled to retract the latch portion **214** from a slot **220** which releases the indexing portion **206** and allows the armrest **208** to be raised or lowered as desired. Ideally, the side structure **22** would define a plurality of vertically aligned slots **220** so that the armrest **208** may be locked into multiple vertical positions.

(62) Any embodiment of the present invention may include any of the features of the other embodiments of the present invention. The exemplary embodiments herein disclosed are not intended to be exhaustive or to unnecessarily limit the scope of the invention. The exemplary embodiments were chosen and described in order to explain the principles of the present invention so that others skilled in the art may practice the invention. Having shown and described exemplary embodiments of the present invention, those skilled in the art will realize that many variations and modifications may be made to the described invention. Many of those variations and modifications will provide the same result and fall within the spirit of the claimed invention. It is the intention, therefore, to limit the invention only as indicated by the scope of the claims.

Claims

1. A wheelchair comprising: a base assembly comprising: a central frame comprising a forward portion and a rear portion; a leg assembly comprising: a leg comprising an elongated body that defines a top end and a bottom end; a caster wheel subassembly connected to the bottom end of the leg; a connecting means for connecting the top end of the leg to the forward portion of the central frame, wherein: the connecting means provides for the movement of the leg between at least a first position and a second position; the location of the caster wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position; and a seat assembly disposed above and connected to the central frame.

2. The wheelchair of claim 1, wherein: the connecting means compromises a shaft, receiving channel, and a latch mechanism; the shaft is attached to the top end of the leg and the receiving channel is defined in the central frame; the shaft is inserted into the receiving channel to connect the leg assembly to the central frame; and the latch mechanism is configured to restrict telescopic movement between the shaft and the receiving channel.

3. The wheelchair of claim 2, wherein: the connecting means further comprises a hirth joint that comprises a first hirth coupling and a second hirth coupling; the first hirth coupling is provided on the shaft and the second hirth coupling is provided on the central frame; the hirth coupling is configured to lock the shaft into an angular orientation relative to the receiving channel when the first hirth coupling is coupled with the second hirth coupling.

4. The wheelchair of claim 2, wherein latch mechanism comprises a through-hole defined in the receiving channel, a receiving hole defined in the shaft, and a plunger pin inserted through the through-hole and the receiving hole.

5. The wheelchair of claim 1, wherein: the connecting means comprises a hinge that connects the top end of the leg to the central frame; the connecting means further comprises a sliding bolt lock

that comprises a bolt, a lever connected to the bolt, and a receiving channel for the bolt; the bolt is housed within the top end of the leg and the receiving channel is defined in the central frame; the lever is configured to move the bolt into and out of the receiving channel to engage and disengage the sliding bolt lock, respectively.

6. The wheelchair of claim 1, wherein the central frame comprises a suspension member connected to the seat component and to the central frame, wherein the suspension member is configured to support the seat component from below.

7. The wheelchair of claim 1, wherein: the central frame comprises two longitudinal members that extend from the rear portion of the central frame to the forward portion; the two longitudinal members are angled inwards along the rear portion and away from each other along the forward portion; and the connecting means connects the top end of the leg to one of the longitudinal members along the forward portion of the central frame.

8. The wheelchair of claim 1, wherein the leg assembly further comprises a footrest subassembly comprising a footrest and a front rigging that attaches the footrest to leg.

9. The wheelchair of claim 8, wherein the front rigging comprising a collar portion that is received over the leg, wherein the collar portion enables the entire leg assembly to pivot around the leg.

10. A wheelchair comprising: a base assembly comprising: a central frame comprising a forward portion and a rear portion; a leg assembly comprising: a leg comprising an elongated body that defines a top end and a bottom end; a caster wheel subassembly connected to the bottom end of the leg; a connecting means for connecting the top end of the leg to the forward portion of the central frame, wherein: the connecting means provides for the movement of the leg between at least a first position and a second position; the location of the caster wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position; a seat assembly comprising: a seat component disposed above and connected to the central frame, the seat component comprising a forward portion and a rear portion; a first side structure and an opposing second side structure, the first and second side structures being disposed near the rear portion of the seat component; a backrest component disposed between the first side structure and the second side structure, the backrest component comprising a top portion and a bottom portion; a first trunnion joint and a second trunnion joint, wherein the first and second trunnion joints connect the bottom portion of the backrest component to the first side structure and the second side structure, respectively, and wherein: the first trunnion joint and the second trunnion joint enable the backrest to pivot between at least a first angular position and a second angular position; and the top portion of the backrest component is closer to the seat component when the backrest component is in the first angular position than in the second angular position; and a latch mechanism configured to lock the backrest in at least one of the first angular position and the second angular position.

11. The wheelchair of claim 10, wherein: the latch mechanism comprises a pull handle connected to a drawstring, the drawstring comprising an end; the end of the drawstring is connected to a pin that is housed within a channel defined in the backrest component; the first side structure comprises a receiving hole for the pin; the latch mechanism further comprises a spring that biases the pin towards the receiving hole such that, when the pin is received in the receiving hole the backrest component is locked into an angular position; and pulling the pull handle causes the drawstring to retract the pin from the receiving hole, thereby releasing the backrest component.

12. The wheelchair of claim 11, wherein: the first side structure defines a plurality of receiving holes radially spaced from one another relative to the first trunnion joint; each receiving hole of the plurality of receiving holes is configured to receive the pin and lock the backrest in a different angular position.

13. The wheelchair of claim 10, wherein the first trunnion joint and the second trunnion joint are both aligned along a common axis.

14. The wheelchair of claim 10, wherein the seat component comprises at least one of padding, cushioning, upholstery, and paneling.

15. The wheelchair of claim 10, wherein the backrest component comprises at least one of padding, cushioning, upholstery, and paneling.
16. The wheelchair of claim 10, wherein the at least one of the first and second side structures comprises at least one of padding, cushioning, upholstery, and paneling.
17. A wheelchair comprising: a base assembly comprising: a central frame comprising a forward portion and a rear portion; a leg assembly comprising: a leg comprising an elongated body that defines a top end and a bottom end; a caster wheel subassembly connected to the bottom end of the leg; a connecting means for connecting the top end of the leg to the forward portion central frame, wherein: the connecting means provides for the movement of the leg between at least a first position and a second position; the location of the caster wheel subassembly is further away from the central frame when the leg is in the first position than when the leg is in the second position; a seat assembly comprising: a seat component disposed above and connected to the central frame, the seat component comprising a forward portion and a rear portion; a first side structure and an opposing second side structure, the first and second side structures being disposed near the rear portion of the seat component; a backrest component disposed between the first side structure and the second side structure, the backrest component comprising a top portion and a bottom portion; a first trunnion joint and a second trunnion joint, wherein the first and second trunnion joints connect the bottom portion of the backrest component to the first side structure and the second side structure, respectively, and wherein: the first trunnion joint and the second trunnion joint enable the backrest to pivot between at least a first angular position and a second angular position; and the top portion of the backrest component is closer to the seat component when the backrest component is in the first angular position than in the second angular position a latch mechanism configured to lock the backrest in at least one of the first angular position and the second angular position; and a height-adjustable armrest assembly provided on the first side structure.
18. The wheelchair of claim 17, wherein: the armrest assembly comprises an armrest, an indexing member, a mounting bracket, and a latch mechanism; the mounting bracket is attached to the first side structure; the indexing member is received within the mounting bracket and permitted to slide vertically therein; the armrest is attached to the indexing member; and the latch mechanism is configured to lock the armrest at a vertical position.
19. The wheelchair of claim 18, wherein: the latch mechanism comprises a lever, a spring, and plurality of vertically aligned slots defined in the first side structure; the lever is connected to the indexing member and is biased towards the first side structure by the spring such that the lever is received within a slot in the first side structure; and compressing the spring retracts the lever from the slot, thereby releasing the indexing member.
20. The wheelchair of claim 10, wherein: the connecting means compromises a shaft, receiving channel, and a latch mechanism; the shaft is attached to the top end of the leg and the receiving channel is defined in the central frame; the shaft is inserted into the receiving channel to connect the leg assembly to the central frame; the latch mechanism is configured to restrict telescopic movement between the shaft and the receiving channel; the connecting means further comprises a hirth joint that comprises a first hirth coupling and a second hirth coupling; the first hirth coupling is provided on the shaft and the second hirth coupling is provided on the central frame; and the hirth coupling is configured to lock the shaft into an angular orientation relative to the receiving channel when the first hirth coupling is coupled with the second hirth coupling.