(54) Title: GLIDING ROCKING CHAIR AND OTTOMAN

(57) Abstract: A furniture system includes a chair and an ottoman. The chair, includes a seat, a seatback, first and second armrests, first and second base structures, and at least one chair linkage system. The seat moves relative to the first and second base structures according to the at least one linkage system. The chair includes a receptacle that stores the ottoman. The ottoman includes a top structure and at least one base structure. The top structure transitions between a first mode and a second mode. In the first mode, the top structure is positioned at a first angle relative to the at least one base structure and moves relative to the at least one base structure. In the second mode, the top structure is positioned at a second angle relative to the at least one base structure and remains fixed relative to the at least one base structure.
Published:

— with international search report (Art. 21(3))
GLIDING ROCKING CHAIR AND OTTOMAN

CROSS REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The invention relates to chairs and ottomans, and more particularly, to systems and methods involving gliding rocking chairs and ottomans that have various operating modes, e.g., to facilitate nursing activity by the user.

Description of Related Art

[0003] Gliding rocking chairs, also known as glider rockers, are chairs that allow a user sitting in the chair to rock by gliding forward and backward. Glider rockers have become particularly popular among people with infants. In addition to comfortably supporting a person while holding an infant, glider rockers provide a smooth rocking motion that soothes the infant. Correspondingly, glider rockers are used when a person is nursing an infant.

[0004] Glider rockers may also be provided with an accompanying ottoman to provide leg support for a user seated in the glider rocker. In some cases, the ottoman is a gliding ottoman that provides a greater range of gliding movement for the user.

SUMMARY

[0005] Embodiments according to aspects of the present invention are directed to gliding rocking chairs and ottomans that have various operating modes. Aspects of the present invention
provide systems and methods for easily and safely changing the operating modes for gliding rocking chairs and ottomans.

[0006] According to aspects of the present invention, a chair includes a seat, a seatback, a first armrest including a first cavity, a second armrest including a second cavity, a first base structure, and a second base structure. A first linkage system is disposed in the first cavity of the first armrest and couples the seat to the first base structure. A second linkage system is disposed in the second cavity of the second armrest and couples the seat to the second base structure. The first base structure and the second base structure provide lower support for the seat, the seatback, and the first and second armrests. The seat, the seatback, and the first and second armrests move together in a fixed assembly relative to the first base structure and the second base structure according to the first linkage system and the second linkage system. In some embodiments, the fixed assembly moves relative to the first base structure and the second base structure into at least one releasably locked position, which may include a recline position and/or an ingress/egress position.

[0007] According to additional aspects of the present invention, an ottoman includes a top structure, a body, and at least one base structure. A guide system couples the top structure to the body. At least one linkage system couples the body to the at least one base structure. In a first mode, the top structure and the body move together relative to the at least one base structure according to the at least one linkage system, the top structure being positioned at a first angle relative to the body. In a second mode, the top structure is moved into a second angle relative to the body according to the guide system.

[0008] According to further aspects of the present invention, an ottoman includes a top structure and at least one base structure. The top structure transitions between a first mode and a second mode. In the first mode, the top structure is positioned at a first angle relative to the at least one base structure and moves relative to the at least one base structure. In the second mode, the top structure is positioned at a second angle relative to the at least one base structure and remains fixed relative to the at least one base structure.

[0009] According to aspects of the present invention, a furniture system includes a chair and an ottoman. The chair, includes a seat, a seatback, a first armrest, a second armrest, a first base structure, a second base structure, and at least one linkage system. The first base structure and the second base structure provide lower support for the seat, the seatback, and the first and
second armrests. The seat moves relative to the first base structure and the second base structure according to the at least one linkage system. The ottoman includes a top structure and at least one base structure. The top structure transitions between a first mode and a second mode. In the first mode, the top structure is positioned at a first angle relative to the at least one base structure and moves relative to the at least one base structure. In the second mode, the top structure is positioned at a second angle relative to the at least one base structure and remains fixed relative to the at least one base structure. The chair includes a recess dimensioned to receive the ottoman for storage.

Additional aspects of the invention will be apparent to those of ordinary skill in the art in view of the detailed description of various embodiments, which is made with reference to the drawings, a brief description of which is provided below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A illustrates an example chair and ottoman according to aspects of the present invention.

FIG. 1B illustrates the chair and ottoman of FIG. 1A, where the ottoman is stored in a recess under the seat of the chair according to aspects of the present invention.

FIG. 2 illustrates example structural features of the chair of FIG. 1A according to aspects of the present invention.

FIG. 3 illustrates an example linkage system for the chair of FIG. 1A according to aspects of the present invention.

FIG. 4 illustrates an example seat bracket for the chair of FIG. 1A according to aspects of the present invention.

FIG. 5A illustrates a recline position for the chair of FIG. 1A according to aspects of the present invention.

FIG. 5B illustrates a simplified diagram of an ingress/egress position for the chair of FIG. 1A according to aspects of the present invention.

FIG. 6 illustrates a gliding mode for the ottoman of FIG. 1A according to aspects of the present invention.

FIG. 7 illustrates a nursing mode for the ottoman of FIG. 1A according to aspects of the present invention.
FIG. 8 illustrates example structural features of the ottoman of FIG. 1A according to aspects of the present invention.

FIG. 9 illustrates an example technique for configuring the ottoman of FIG. 1A to operate in a nursing mode according to aspects of the present invention.

FIG. 10 illustrates example structural features of the ottoman of FIG. 1A according to aspects of the present invention.

FIG. 11 illustrates another example ottoman according to aspects of the present invention.

FIG. 12 illustrates another example ottoman according to aspects of the present invention.

FIG. 13 illustrates another example ottoman according to aspects of the present invention.

FIG. 14A illustrates another example ottoman according to aspects of the present invention.

FIG. 14B illustrates example structural features of the ottoman of FIG. 14A according to aspects of the present invention.

FIG. 14C illustrates example structural features of the ottoman of FIG. 14A according to aspects of the present invention.

FIG. 15A illustrates another example ottoman in gliding mode according to aspects of the present invention.

FIG. 15B illustrates the ottoman of FIG. 15A in nursing mode according to aspects of the present invention.

FIG. 16 illustrates example structural features of the ottoman of FIG. 15A according to aspects of the present invention.

FIG. 17 illustrates example structural features of the ottoman of FIG. 15A according to aspects of the present invention.

FIG. 18 illustrates example structural features of the ottoman of FIG. 15A according to aspects of the present invention.

FIG. 19 illustrates example structural features of the ottoman of FIG. 15A according to aspects of the present invention.
FIG. 20 illustrates example structural features of the ottoman of FIG. 15A according to aspects of the present invention.

FIG. 21A illustrates example optional features for the chair of FIG. 1A according to aspects of the present invention.

FIG. 21B illustrates example optional features for the chair of FIG. 1A according to aspects of the present invention.

FIG. 22A illustrates an example lighting system for the chair of FIG. 1A according to aspects of the present invention.

FIG. 22B illustrates an example technique for operating lighting system of FIG. 22A according to aspects of the present invention.

While the invention is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION

Referring to FIGS. 1A and IB, a chair 100 and an ottoman 200 according to aspects of the present invention are illustrated. The chair 100 includes a seat 102, right and left armrests 104a, b, a seatback 106, and right and left base structures 110a, b. The ottoman 200 includes a top structure 202, a body 204, and right and left base structures 206a, b. In FIG. 1A, the ottoman 200 is positioned relative to the chair 100 so that a person can use the top structure 202 as a footrest while seated in the chair 100. In FIG. 1B, the ottoman 200 is stored in a recess 108 under the seat 102 of the chair 100, when the ottoman 200 is not required for leg support. The chair 100 is structurally configured to provide the features of a glider rocker while accommodating storage of the ottoman 200 in the recess 108.

Referring to FIG. 2, structural features of the chair 100 are illustrated. The chair 100 includes two base structures 110a, b on right and left sides of the chair 100, respectively. The base structures 110a, b allow the chair 100 to be stably positioned on a floor surface and support an assembly 111 of the chair 100. The assembly 111 includes a seat support 112, right and left
armrest supports 114a, b, and a seatback support 116. The seat support 112, armrest supports 114a, b, and seatback support 116 provide the internal structures (no cushion, upholstery, covering, etc.) for the seat 102, armrest 104a,b, and the seatback 106, respectively. The internal structures and other aspects of the chair 100 as well as the ottoman 200 may be formed from any combination of wood, metal, plastic, composite material, or any other material having appropriate structural characteristics, e.g., strength, hardness, durability, etc. Cushions, upholstery, coverings, and the like may be applied to the internal structures according to any technique. The structures of the chair 100 as well as the ottoman 200 may be assembled according to any combination of fastening techniques, including, but not limited to, the use of screws, nails, pegs, rods, rivets, bolts, supporting brackets and plates, interlocking elements, press-fit connections, adhesives, and the like.

[0043] The seat support 112, armrest supports 114a, b, and seatback support 116 are assembled in a fixed configuration and move together in gliding/rocking motion relative to the base structures 110a, b. Although the seat support 112, armrest supports 114a, b, and seatback support 116 may move together relative to the base structures 110a, b, it is contemplated that the configuration of the seat support 112, armrest supports 114a, b, and seatback support 116 relative to each other may be adjusted and releasably fixed. For example, the seatback 106 may be adjusted relative to the seat 102 and the armrest supports 114a, b for custom comfort.

[0044] As shown in FIG. 2, the base structures 110a, b are transversely coupled by a cross-brace 110c for additional stability. The cross-brace 110c is positioned so that sufficient space is provided for the recess 108 and the ottoman 200 can be stored in the recess 108. In alternative embodiments, the cross-brace 110c is not employed and the base structures 110a, b provide sufficient stability for chair 100.

[0045] A user can use his/her body to move the chair 100 forward and backward in a gliding/rocking mode. To permit relative movement between the base structures 110a, b and the frame assembly 111, the seat support 112 is coupled to the base structures 110a, b by a respective linkage system 120a, b. The linkage systems 120a, b allow the frame assembly 111 to swing back and forth so that the chair 100 can provide a smooth gliding/rocking motion. The linkage systems 120a, b are disposed in cavities 115a, b formed in each respective armrest 104a, b of the chair 100. It is noted that the armrest supports 114a, b are not directly coupled to the base structures 110a, b, so that the seat support 112, the armrest supports 114a, b, and the
seatback support 116 can move in fixed configuration relative to the base structures 110a, b. The cavities 115a, b formed by the armrests 104a, b accommodate the linkage systems 120a, b while also allowing the armrests 120a, b to move with the seat 102 and seatback 106 relative to the base structures 110a, b. By locating the linkage systems 120a, b in the cavities 115a, b, a space under the seat 102 is open to provide the recess 108 for receiving the ottoman 200. In addition, keeping the linkage systems 120a, b hidden within the armrests 104a, b minimizes any risk of injury from contact with their moving parts.

[0046] FIG. 3 illustrates selected structural features of the chair 100 more clearly by omitting some aspects of the frame assembly 111. As shown in FIG. 3, the linkage systems 120a, b include side walls 121a, b that are coupled to, and extend upwardly from, the respective base structures 110a, b. Upper bars 122a, b are disposed across respective side walls 121a, b. Referring to the right linkage system 120a shown more clearly in FIG. 3, a front linkage arm 123a and a rear linkage arm 124a are pivotally coupled to the upper bar 122a and extend downwardly to be pivotally coupled to a seat bracket 130 coupled to the seat support 112. The linkage arms 123a and 124a are non-parallel and improve the quality of motion of the frame assembly 111 by making the motion more linear. The left linkage system 120b is configured in a manner similar to the right linkage system 120a.

[0047] The seat bracket 130 coupled to the seat support 112 is shown further in FIG. 4. The bracket 130 includes two transverse bars 131a, b that extend along the bottom of the seat support 112. The two transverse bars 131a, b extend downwardly from each side of the seat support 112 and are coupled to a right lower bar 132a and a left lower bar 132b. The right lower bar 132a is pivotally coupled to the linkage arms 123a and 124a of the right linkage system 120a. Correspondingly, the left lower bar 132b is pivotally coupled to the linkage arms 123b and 124b of the left linkage system 120b.

[0048] In addition to providing a rocking motion, movement of the frame assembly 111 relative to the base structures 110a, b also provides various seating positions. As illustrated in FIG. 5A, the chair 100 provides a recline mode. During operation, when the user pushes rearwardly against the seatback 106, the seat 102 and seat bracket 130 move correspondingly with the seatback 130. The linkage arms 123a, b and 124a, b pivot with the movement of the seat bracket 130, which is coupled to the linkage arms 123a, b and 124a, b. As the linkage arms 123a, b and 124a, b pivot, the rear linkage arms 123a, b effectively push the rear of the seat
bracket 130 downwardly. Meanwhile, the front linkage arms 123a, b effectively pull up the front of the seat bracket 130. The combined action of the non-parallel linkage arms 123a, b and 124a, b cause the frame assembly 111 to tilt rearwardly and move into the recline position. The user achieves the recline position simply by shifting his/her weight to the rear without employing a supplemental recline mechanism.

[0049] As further illustrated in FIG. 5A, a magnetic locking system is employed to keep the chair 100 in the recline position. In the magnetic locking system, magnetic elements 142a, b are attached to respective front linkage arms 123a, b, and magnetic elements 144a, b are attached to the seat bracket 130. The magnetic elements as described herein may include a combination of magnets (of opposing polarity) or a combination of magnets and materials, e.g., iron, that are attracted to magnets. The magnetic elements 142a, b and 144a, b are located so that when the front linkage arms 123a, b pivot into the recline position, corresponding magnetic elements 142a, b and 144a, b engage each other. The attraction between the corresponding magnetic elements 142a, b and 144a, b lock the chair 100 into the recline position by keeping the front linkage arms 123a, b in a releasably fixed position relative to the bracket 130 and thus, the frame assembly 111. The frame assembly 111 can move relative to the base structures 110a, b only if the linkage arms 123a, b and 124a, b are allowed to pivot relative to the bracket 130. To exit from the recline position, the user shifts his/her weight forward and acts sufficiently against the attraction between the magnetic elements 142a, b and 144a, b, causing the linkage arms 123a, b and 124a, b to pivot in the reverse direction.

[0050] In some embodiments, as generally shown in the simplified diagram of FIG. 5B, the chair 100 also provides an ingress/egress position that releasably locks the chair 100 into a position that allows a user to enter and exit the chair 100 more easily. When the user shifts his/her weight forward, the seat bracket 130 moves forward with the seat 102, and the linkage arms 123a, b and 124a, b pivot with the movement of the seat bracket 130. As the linkage arms 123a, b and 124a, b pivot in this case, the rear linkage arms 123a, b effectively lift the rear of the seat bracket 130 upwardly. Meanwhile, the front linkage arms 123a, b effectively push down the front of the seat bracket 130. The combined action of the non-parallel linkage arms 123a, b and 124a, b cause the front of the frame assembly 111 to tilt downwardly. The resulting angle allows the user to enter or exit the chair 100 more easily. The user achieves the ingress/egress position simply by shifting his/her weight forward without employing a supplemental mechanism. A lock
system similar to the magnetic locking system described above may be employed to lock the chair 100 into the ingress/egress position.

[0051] Alternative mechanisms may be employed to lock the chair 100 into various positions. For example, some embodiments may employ a latch that releasably locks one or more of the linkage arms 123a, b relative to the frame assembly 111. The latch may be released by an easily accessible release handle. In another example, one or more of the linkage arms 123a, b may include a locking pin that moves in a slot along a locking arm and when the seat reaches the desired position, a spring-loaded nut of the locking pin locks into a locking ring positioned along the slot. The locking pin is released when a cable attached to the locking arm is pulled by a release handle and allows the spring to be compressed and the nut of the locking pin to move from the locking ring. It is also noted that when the ottoman 200 is positioned in the recess 108 of the chair 100 as shown in FIG. IB, the ottoman 200 may block any motion of the frame assembly 111 relative to the base structures 110a, b, thereby blocking the chair from any gliding/rocking motion.

[0052] The chair 100 described previous is an example embodiment illustrating various aspects of the present invention. It is contemplated that the chair 100 may include additional and/or alternative features. For example, as shown in FIGS. 21A and B, the chair 100 is equipped with various optional features located on various parts of the chair 100. In particular, the armrest 104a includes a flip-out desk and lamp system 150 as well as a cup holder 151. The armrest 104b includes a docking station 152 for receiving a portable audio device, and correspondingly, a plurality of speakers 153 are disposed in different locations of the chair 100 to provide an integrated audio system. Furthermore, the seatback 106 includes a heated back massager 154. In addition, the base structures 110a, b include light sources 155, e.g., LED's approximately 2 inches above the floor surface, to provide path lighting in front of the chair 100. The path lighting is advantageous when the user is attending to a child in a dark room, e.g., in the middle of the night. The path lighting, for example, helps the user move through a dark room or operate an ottoman positioned in front of the chair 100. In some embodiments, the light sources 155 may include a cluster of red, green, blue (RGB) LED's that can provide color changing effects, e.g., according to a relaxing pattern. The armrest 104b also includes a control panel 156 for controlling features, such as the volume to the speakers 153, the massager 154, or the light
sources 155. The electrically powered features may draw power from batteries and/or a conventional electrical outlet.

[0053] In some embodiments, the light sources 155 are manually activated, e.g., via the control panel 156. Additionally or alternatively, control of the light sources 155 may be automated. For example, the light sources 155 may be turned on/off or dimmed/brightened in response to a timing system and/or a sensor system (e.g., pressure sensors, magnetic sensors, light sensors, etc.). In one embodiment, the user may turn the light sources 155 on manually by operating an ON/OFF switch, and in response, the light sources 155 provide lighting for a predetermined amount of time, e.g., 2 minutes, until a timing system turns the light sources off.

[0054] FIGS. 22A and B illustrate another embodiment for controlling the light sources 155. As FIG. 22A illustrates, the chair 100 also includes an ON/OFF switch 157 which may be provided on the control panel 156, a control device 160, at least one magnetic sensor 161, and at least one pressure sensor 162. The control device 160 includes modules for controlling the light sources 155, e.g., primary and secondary timers. The control device 160 may also include a battery for providing power to the light sources 155. As FIG. 22B illustrates, when the user comes into contact with the chair 100, a magnetic sensor 161 disposed on the chair, e.g., at the linkage system 120b, detects motion by the chair 100. If the room is sufficiently dark, a primary timer activates the light sources 155 for a first predetermined amount of time, e.g., 30 seconds. In some cases, other features such as the audio system may be also activated. The light sources 155 may slowly brighten until fully illuminated and/or may provide color changing effects with RGB LED's during the first predetermined amount of time. The primary timer deactivates the light sources 155 after the first predetermined amount of time. The user may manually control the light sources 155 so that they remain illuminated for a desired period after the first predetermined amount of time. A pressure sensor 162 disposed on the seat support 112 senses the user sitting in the chair 100. Once the user gets up from the chair 100, a secondary timer activates the light sources 155 (if not already active) for a second predetermined amount of time, e.g., 2 minutes. After the second predetermined amount of time, the light sources 155 deactivate.

[0055] As described previously, cushions, upholstery, coverings, and the like may be applied to the internal structures according to any technique. The chair 100 may be outfitted in an unlimited variety of upholstery configurations. The upholstery may be removable slip covers to facilitate cleaning and/or to provide changeable designs. In some embodiments, the chair 100 is
not completely upholstered and may be a hybrid wood and upholstered chair. The chair 100 may also include a variety of cushions, such as a seat cushion or elbow pads. The height, width, and position of the cushions may vary. Furthermore, the cushions, such as elbow pads, may be removed according to user preference. Indeed, it is contemplated that the chair 100 may be shipped as any combination of sub-assemblies or modules that require final assembly by the consumer, including the application of separate cushions, upholstery, coverings, and the like.

[0056] Referring to FIGS. 6-11, structural features of the ottoman 200 are illustrated. The ottoman 200 provides two operating modes: a gliding mode and a nursing mode. FIG. 6 illustrates the ottoman 200 in the gliding mode. In the gliding mode, the top structure 202 and the body 204 move together relative to base structures 206a, b in a backward and forward direction. When used with the chair 100, the ottoman 200 provides a greater range of gliding movement for the user. The body 204 is coupled to the base structures 206a, b with linkage systems 210a, b on each side. FIG. 8 illustrates aspects of the right base structure 206a and the right linkage system 210a, which are disposed in a cavity 205a defined by the body 204. The right linkage system 210a includes a side wall 213a that extends upwardly from base structure 206a which is positioned on a floor surface. The linkage system 210a includes an upper bar 211a that is positioned along the top of the side wall 213a. A pair of non-parallel linkage arms 213a and 214a are pivotally coupled to the upper bar 211a and extend downwardly where they are pivotally coupled to a wall 216a of the body 204. The left linkage system 210b on the opposite side of the ottoman 200 is configured in a manner similar to the right linkage system 210a. In the gliding mode, the linkage arms 212a, b and 214a, b swing to allow the body 204 (and the top structure 202) to glide relative to the base structures 206a, b. The top surface 202a of the top structure 202 provides a substantially horizontal footrest.

[0057] FIG. 7 illustrates the ottoman 200 in the nursing mode. In the nursing mode, the top structure 202 is moved relative to the body 204 to provide an angled footrest. Advantageously, the angled footrest provides more comfortable and stable support for a user who is holding or nursing an infant while seated in the chair 100. It is understood, however, that the ottoman 200 may have more general uses when it is in the nursing mode. FIG. 9 illustrates an example technique for configuring the ottoman 200 from the gliding mode shown in FIG. 6 to the nursing mode shown in FIG. 7. In step A, the user, e.g., with a foot, pushes upward against a bottom surface 202b of the top structure 202 at a first end 202c. The first end 202c of the top structure
202 includes an indentation 221 on the bottom surface 202b to help the user engage the bottom surface 202b with his/her foot.

FIGS. 8-10 collectively illustrate a guide system that guides movement of the top structure 202 relative to the body 204, from the gliding mode to the nursing mode. In particular, the top structure 202 includes pins 222a, b on respective sides of the top structure 202, proximate to the first end 202c. The pins 222a, b extend respectively from the top structure 202 into curved tracks 223a, b disposed in the body 204. The top structure 202 also includes pins 224a, b on respective sides of the top structure 202, proximate to a second end 202d. The pins 224a, b extend respectively from the top structure 202 into straighter tracks 225a, b disposed in the body 204. The curved tracks 223a, b guide movement of corresponding pins 222a, b proximate to the first end 202c, and the straighter tracks 225a, b guide movement of corresponding pins 224a, b proximate to the second end 202d.

Generally, the combined movement of the pins 222a, b and 224a, b along the tracks 223a, b and 225a, b causes the top structure 202 to move into an angled position relative to the body 204. Pushing upward on the first end 202b of the top structure 202 in step A causes the top structure 202 to pivot upward about the pins 224a, b proximate to the second end 202d. The pins 222a, b proximate to the first end 202c move upwardly along the corresponding curved tracks 223a, b.

In step B, the user pulls the top structure 202 back, as shown in FIG. 9. Pulling back on the top structure 202 causes the top structure 202 to move horizontally. The pins 222a, b move back along the corresponding curved tracks 223a, b, and the pins 224a, b move back along the corresponding straight tracks 225a, b until the straight tracks 225a, b end and the pins 224a, b can no longer move. At this point, the top structure 202 pivots about the pins 224a, b and the pins 222a, b move downward along the corresponding curved tracks 223a, b.

In step C, the user allows the first end 202c to lower until the pins 222a, b reach the bottom of the corresponding curved tracks 223a, b. Here, the pins 222a, b proximate to the first end 202c are positioned a distance below the pins 224a, b proximate to the second end 202d and thus the top structure 202 extending between the pins 222a, b and 224a, b is angled relative to the horizontal.

As shown in FIG. 10, during the nursing mode, the top structure 202 is in contact with a linkage arm stabilizer bar 226 that extends transversely between the linkage arms 212a, b.
The top structure 202 prevents any movement by stabilizer bar 226 and thus the linkage arms 212a,b. As such, there is no gliding motion by the ottoman 200 when it is in the nursing mode. Alternatively, one or more of the pins 222a, b proximate to the first end 202c may be moved directly against one of the linkage arms 212a, b so that the linkage arms 212a, b and 214a, b cannot swing.

[0063] FIG. 11 illustrates another ottoman 300 which may be employed, for example, with the chair 100. The ottoman 300 includes a top structure 302 and a body 304. The top structure 302 moves relative to the base 304 to provide two operating modes: a gliding mode and a nursing mode. The top structure 302 is coupled to the base 304 with linkage systems 310a, b on respective sides of the ottoman 300. As shown in FIG. 11, each linkage system 310a, b includes a respective pair of non-parallel linkage arms 312a, b and 314a, b that are pivotally coupled to each of the top structure 302 and the base 304. In the gliding mode, the linkage arms 312a, b and 314a, b of the linkage systems 310a, b swing to allow the top structure 302 to glide horizontally relative to the base 304.

[0064] To configure the ottoman 300 from the gliding mode to the nursing mode, the user, e.g., with a foot, pushes against the top structure 302 until a magnetic element 322 on one of the linkage arms, e.g., linkage arm 314b, moves into contact with a corresponding magnetic element 324 on the base 304. A magnetic locking system for the ottoman 300 includes one or more magnetic elements 322 disposed on the top structure 302 and one or more magnetic elements 324 disposed on the base 304. The magnetic elements 322 and 324 attractively engage each other to lock the top structure 302 against the base 304 to prevent relative motion between the top structure 302 and the base 304. With the top structure 302 locked into place by the magnetic locking system 320, an angled footrest 326 fixed to the base 304 below the top structure 302 is uncovered. The angled footrest 326 provides the nursing mode. The top structure 302 can be released from the base 304 by applying a force to the top structure 302 to overcome the magnetic locking system and return the ottoman 300 to the first operating mode.

[0065] FIG. 12 illustrates yet another ottoman 400 which may be employed, for example, with the chair 100. The ottoman 400 includes a top structure 402 and a base 404. Like the ottoman 300, the top structure 402 moves relative to the base 404 to provide two operating modes: a gliding mode and a nursing mode. The top structure 402 is coupled to the base 404 with a linkage system 410 on each side. Each linkage system 410 is configured in a manner
similar to the linkage systems 310a, b described above. In particular, each linkage system 410 includes a pair of non-parallel linkage arms that are pivotally coupled to each of the top structure 402 and the base 404. In the gliding mode, the linkage arms of each linkage system 410 swing to allow the top structure 402 to glide horizontally relative to the base 404.

To achieve the nursing mode, the user (e.g., with a foot) pushes against the top structure 402 until an angled footrest 426 fixed to the base 404 is uncovered. The top structure 402 is sized so that the angled footrest 426 is uncovered by allowing the top structure 402 to glide to one side without locking the top structure 402 into place, e.g., without the magnetic locking system 320 described above. A larger top structure 402 would otherwise require a locking mechanism to move the top structure 402 completely out of the way against the linkage systems 410.

The ottoman 400 also includes a storage drawer 430. As shown in FIG. 12, the storage drawer 430 may slide through a passageway that extends through the body 404, so that the storage drawer 430 is accessible from two opposing sides of the ottoman 400.

Referring to FIG. 13, another ottoman 500 is illustrated. Although the ottoman 500 may be similar to the other embodiments described previously, the ottoman 500 also includes a heel arch 540. The heel arch 540 is an indentation along the top surface 502a of the top structure 502 that allows a user seated in the chair 100 to engage and position the ottoman 500 with his/her feet. In particular, the person can move the ottoman into or out of the recess 108 under the chair 100. The chair 100 may optionally include a handle 550, as shown in FIG. 13, which operates a cantilever bar 552 which pushes the ottoman 500 a sufficient distance outward to allow the user to engage the ottoman 500 using the heel arch 540.

Referring to FIGS. 14A-C, yet another ottoman 600 is illustrated. The ottoman 600 includes a top structure 602 and a base 604. The top structure 602 moves relative to the base 404 to provide a gliding mode. The top structure 602 is coupled to the base 604 with a linkage system 610 on each side. Each linkage system 610 is configured in a manner similar to the linkage systems described above. In particular, each linkage system 610 includes a pair of non-parallel linkage arms that are pivotally coupled to each of the top structure 602 and the base 604. In the gliding mode, the linkage arms of each linkage system 610 swing to allow the top structure 602 to glide horizontally relative to the base 604.
The top structure 602 of the ottoman 600 acts as a removable lid that opens to an interior storage area 630. As shown in FIG. 14C, the top structure 602 can be stably positioned on the floor surface and against the base 604 to provide an angled, e.g., approximately 45-degree, surface that provides a nursing mode for the ottoman 600. A bracket 620 may be employed to position the top structure 602 stably against the base 604. The cut-away view of FIG. 14C illustrates an embodiment of the bracket 620, which is coupled to the bottom surface of the top structure 602 and engages a wall of the base 604 to position the top structure 602 at a particular angle. The bracket 620 prevents the top structure 602 from sliding down the side of the base 604.

FIGS. 15-20 illustrate features of another ottoman 700 that may be employed, for example, with the chair 100. FIG. 15A illustrates the ottoman 700 in gliding mode, while FIG. 15B illustrates the ottoman 700 in nursing mode. As shown in FIG. 16, the ottoman 700 has a central support structure 710, linkage systems 720, and a top structure 730. The top structure 730 and the central support structure 710 are pivotably coupled to the linkage systems 720 via pivoting hardware.

In the gliding mode, the linkage systems 720 allow the top structure 730 to move relative to the central support structure 710, i.e., move substantially laterally in directions A or B as shown in FIG. 16. As further illustrated in FIGS. 16 and 17, the top structure 730 includes a top platform 731, top supports 732, side bars 733, and bottom supports 734. The top platform 731 may be a padded platform. The padded platform, for example, may be wood covered with padding and a leather, fabric, or synthetic cover. The top platform 731, for example, may have a platform area of about 20 inches by about 16 inches. Of course, the dimensions of the ottomans described herein and their structural elements may vary depending on a number of factors, for example, size of the user, market preferences, and/or dimensions of the corresponding chair, e.g., the chair 100.

The top supports 732 may be elongated structural supports rigidly coupled to the top platform 731. For example, the top supports 732 may be wooden bars having a rectangular cross-section of similar or slightly shorter length than the corresponding dimension of the top platform 731. Each of the top supports 732, for example, may be about 13 to 15 inches long. The bottom supports 734 may be elongated wooden bars of similar length to the top supports.
732, having a substantially rectangular cross-section. The bottom supports 734 are pivotably coupled to linkage systems 720.

[0074] The top of each top support 732 is coupled to the bottom of the top platform 731. The bottom of each of the top supports 732 is coupled to the bottom supports 734 via the side bars 733. The side bars 733, for example, may be wooden rods that connect the top supports 732 to the bottom supports 734 in a substantially parallel arrangement. Each of the top supports 732 and the bottom supports 734 may have bores that receive the side bars 733. Alternative techniques for coupling the side bars 733 to the top support 732 and to the bottom support 734 are also contemplated, however.

[0075] The central support structure 710 includes a pair of base structures 711 for locating the ottoman 700 on a floor surface and providing a steady base for the ottoman 700. Each of the base structures 711 may be an elongated wooden bar having a substantially rectangular cross section. The base structures 711 are transversely coupled in parallel by rods 712. The central support structure 710 further includes center foot bars 713 coupled to, and extending upwardly from, the base structures 711. The center foot bars 713 are also coupled to top foot supports 714 of the central support structure 710. The top foot supports 714 may also be transversely coupled in parallel by the rods 712. The top foot supports 714 are pivotably coupled to the linkage systems 720.

[0076] In addition to providing the gliding mode, the relative arrangement of the central support structure 710, the linkage systems 720, and the top structure 730 also provides a nursing mode. In the nursing mode, the linkage systems 720 allow the top platform 731 to pivot relative to the central support structure 710 and provide an angled footrest. The angle of the footrest may be any angle, for example, between 30-60 degrees. The top portion 730 of the ottoman 700 acts the footrest in both gliding and nursing modes.

[0077] To lock the ottoman 700 in the nursing mode, the ottoman 700 includes a locking mechanism 740 as illustrated in FIG. 18. For example, the locking mechanism 740 includes a pin (not shown), a pair of pin supports 742, and a lever 743. Each of the pin supports 742 is coupled to the bottom surface of top platform 731. The pin supports 742 are arranged in parallel such that a pin may extend between pin supports 742.

[0078] Distal ends of a pin may be inserted in bores formed in each of the pin supports 742 and a central portion of the pin may be inserted through a bore extending fully through the lever
743. FIG. 19 illustrates an exemplary lever 743. The lever 743 may be an elongated bar having a substantially rectangular cross-section. A first end of the lever 743 may have a bore 751 passing configured to receive the pin such that the lever 743 may pivot about a bearing formed by the pin. The lever 743 may pivot freely on the pin such that gravity allows the lever 743 to hang and swing freely as the top structure 730 moves. An engaging structure 752 of the lever 743 may be configured to engage with one of the rods 712 to lock the top structure 730 in the nursing mode.

[0079] A user may configure the ottoman 700 from the gliding mode shown in FIG. 15A to the nursing mode shown in FIG. 15B by applying a force to the top of the top platform 731 to draw the top structure 730 up and back. Such action may be achieved by acting on the top of the top platform 731 with one foot or both feet. Because the lever 743 pivots freely on the pin, the lever 743 may hang due to gravity between the rods 712. As the user pulls the top structure 730, a surface of the lever 743 may slide along a surface of a rod 712. Once the user draws the top structure 730 a certain distance, the engaging structure 752 of the lever 743 engages the rod 712. By engaging the rod 712, the lever 743 locks the top structure 730 in position, e.g., lock the height and tilt/angle of the top structure 730, thus providing a stable angled footrest for the user. According to an aspect of embodiments, a nursing mode for an embodiment may be easily and intuitively achieved by configuring the ottoman with one's foot while already seated in a chair. In particular, a user may safely and easily transform the nursing gliding ottoman from a gliding mode to a nursing mode while seated in the chair 100 and holding an infant.

[0080] Conversely, the user may configure the ottoman 700 from the nursing mode shown in FIG. 15B to the gliding mode shown in FIG. 15A. In particular, the user may manually disengage the lever 743 from the rod 712 and allow the top structure 730 to move into the horizontal position for the gliding mode. By requiring a user to disengage manually the lever 743 from the rod 712, the ottoman 100 remains locked in the nursing mode and will not become accidentally unlocked. Alternatively, the user may place one or both of his/her feet under the top platform 731 and may press upward or forward on the lever 743 to disengage the engaging structure 752 of the lever 743 from the rod 712. Gravity then acts on the top structure 730 to move the ottoman 700 into the gliding mode.

[0081] While the embodiment may easily be configured between the gliding mode and the nursing mode by disengaging the lever 743 from the rod 712, alternative embodiments may
include a safety mechanism, for example, a release control, that requires the user to move from the chair to operate the ottoman 700. Such a safety mechanism may, for example, prevent a user from inadvertently placing his/her foot underneath the top platform 731 in the nursing mode and disengaging the lever 743 from the rod 712. Alternative embodiments may include a plurality of locking mechanisms configured to lock the top structure 730 in a position relative to the bottom structure 710.

FIG. 20 illustrates an alternative exemplary locking mechanism 770 for the ottoman 700. Locking mechanism 770 includes a spring 771 configured to urge a pin 772 into a lock opening 773. A handle 774 may be fixed to an end of the pin 772 to allow a user to urge the pin 772 against the force of spring 771 to disengage locking mechanism 770.

While the present invention has been described in connection with a number of exemplary embodiments, and implementations, the present inventions are not so limited, but rather cover various modifications, and equivalent arrangements, which fall within the purview of prospective claims. For example, although some aspects of the present invention may be described with reference to separate elements, it is understood that some elements may be combined to provide an integrated structure while satisfying the functions of the elements. In addition, although aspects of the present invention may be described in separate embodiments, it is contemplated that the features from more than one embodiment described herein may be combined into a single embodiment. Furthermore, it is also understood that aspects of the present invention are not limited to the particular shapes and dimensions described or illustrated in this present application.
WHAT WE CLAIM IS:

1. A chair, comprising:
   a seat;
   a seatback;
   a first armrest including a first cavity;
   a second armrest including a second cavity;
   a first base structure;
   a second base structure;
   a first linkage system disposed in the first cavity of the first armrest and coupling the seat to the first base structure; and
   a second linkage system disposed in the second cavity of the second armrest and coupling the seat to the second base structure,

   wherein the first base structure and the second base structure provide lower support for the seat, the seatback, and the first and second armrests, and the seat, the seatback, and the first and second armrests move together in a fixed assembly relative to the first base structure and the second base structure according to the first linkage system and the second linkage system.

2. The chair according to claim 1, wherein the first linkage system and the second linkage system each include two non-parallel linkage arms that are pivotably coupled to the seat.

3. The chair according to claim 2, wherein the first linkage system and the second linkage system each include a structure that extends upwardly from the first base structure and the second base structure, respectively, and the two non-parallel linkage arms of each of the first linkage system and the second linkage system are pivotably coupled to an upper part of the respective structure and extend downwardly to the seat.

4. The chair according to claim 1, wherein the seat, the first armrest, the second armrest, the first base structure, and the second base structure define a recess under the seat for storing an ottoman.

5. The chair according to claim 1, wherein the fixed assembly moves relative to the first base structure and the second base structure into at least one releasably locked position.
6. The chair according to claim 5, wherein the at least one releasably locked position includes at least one of a recline position and an ingress/egress position.

7. The chair according to claim 5, wherein the fixed assembly remains in the at least one releasably locked position according to a locking system that prevents movement by linkage arms of the first linkage system and second linkage system.

8. The chair according to claim 7, wherein the locking system includes magnetic elements.

9. The chair according to claim 1, further comprising a path lighting system disposed in the first base structure and the second base structure.

10. An ottoman, comprising:
    a top structure;
    a body;
    at least one base structure;
    a guide system coupling the top structure to the body; and
    at least one linkage system coupling the body to the at least one base structure, wherein in a first mode, the top structure and the body move together relative to the at least one base structure according to the at least one linkage system, the top structure being positioned at a first angle relative to the body, and
    in a second mode, the top structure is moved into a second angle relative to the body according to the guide system.

11. The ottoman according to claim 10, further comprising a locking system that prevents, in the second mode, movement of the top structure and the body relative to the at least one base structure.

12. The ottoman according to claim 11, wherein the locking system includes a bar coupled to the at least one linkage system, and the top structure engages the bar to prevent movement by the at least one linkage system when the top structure is in the second position in the second mode.
13. The ottoman according to claim 10, wherein the top structure includes a surface that is substantially horizontal when the top structure is in the first mode, and the surface is angled relative to the horizontal when the top structure is in the second mode.

14. The ottoman according to claim 10, wherein the guide system includes pins extending from the top structure into grooves disposed in the body, the grooves guiding movement of the pins and the top structure relative to the body.

15. The ottoman according to claim 14, wherein the guide system includes at least one straight groove and at least one curved groove.

16. The ottoman according to claim 10, wherein the at least one linkage system includes non-parallel linkage arms that are pivotably coupled to the at least one base structure and to the body.

17. An ottoman, comprising:
   a top structure; and
   at least one base structure,
   wherein the top structure transitions between a first mode and a second mode, the top structure, in the first mode, being positioned at a first angle relative to the at least one base structure and moving relative to the at least one base structure, and the top structure, in the second mode, being positioned at a second angle relative to the at least one base structure and remaining fixed relative to the at least one base structure.

18. A furniture system, comprising:
   a chair, including
   a seat;
   a seatback;
   a first armrest;
   a second armrest;
   a first base structure;
a second base structure, wherein the first base structure and the second base structure providing lower support for the seat, the seatback, and the first and second armrests; and

at least one linkage system, wherein the seat moves relative to the first base structure and the second base structure according to the at least one linkage system; and

an ottoman including:

a top structure; and

at least one base structure, wherein the top structure transitions between a first mode and a second mode, the top structure, in the first mode, being positioned at a first angle relative to the at least one base structure and moving relative to the at least one base structure, and the top structure, in the second mode, being positioned in a second angle relative to the at least one base structure and remaining fixed relative to the at least one base structure,

wherein the chair includes a recess dimensioned to receive the ottoman for storage.

19. The furniture system of claim 18, wherein the first armrest includes a first cavity, the second armrest includes a second cavity, and the chair further comprises:

a first linkage system disposed in the first cavity of the first armrest and coupling the seat to the first base structure; and

a second linkage system disposed in the second cavity of the second armrest and coupling the seat to the second base structure.

20. The furniture system of claim 18, wherein the ottoman further includes:

a body;

a guide system coupling the top structure to the body; and

at least one linkage system coupling the body to the at least one base structure,

wherein in a first mode, the top structure and the body move together relative to the at least one base structure according to the at least one linkage system, and

in a second mode, the top structure is moved into the second angle according to the guide system.
Motion is detected via magnetic sensor (chair rocks slightly)

Start

No

Is it dark?

Yes

Primary timer module ON (30 sec, cycling) (I-pod charger/ RGB LED cluster activate)

Occupant sits

Secondary timer delay activates (count down sequence not initiated)

Override Switch

Occupant gets up

Count down sequence begins (2 min), Primary timing circuit bypassed

LED's immediately fade on

Timing sequence ends

LED's deactivate, full system shut down

Finish

FIG. 22B
A. CLASSIFICATION OF SUBJECT MATTER

A47C 1/04(2006.01)i, A47C 7/22(2006.01)i

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)

A47C 1/04; A47C 1/031; A47C 3/02; A47C 1/038; A47C 1/024

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: chair, linkage, ottoman, armrest

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>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>See abstract and Fig.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See claims 1-8 and Fig.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See claims 1-11 and Fig.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See abstract and Fig.3</td>
<td></td>
</tr>
</tbody>
</table>

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"&" document member of the same patent family

Date of the actual completion of the international search

28 SEPTEMBER 2011 (28.09.2011)

Date of mailing of the international search report

28 SEPTEMBER 2011 (28.09.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer

JANG, Jong Yun

Telephone No. 82-42-481-5482
### INTERNATIONAL SEARCH REPORT

Information on patent family members

<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 2009-0015050 A1</td>
<td>15.01.2009</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GB 0121732 D1</td>
<td>31.10.2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 6490672 B1</td>
<td>03.12.2002</td>
</tr>
</tbody>
</table>

Form PCT/ISA/210 (patent family annex) (July 2009)