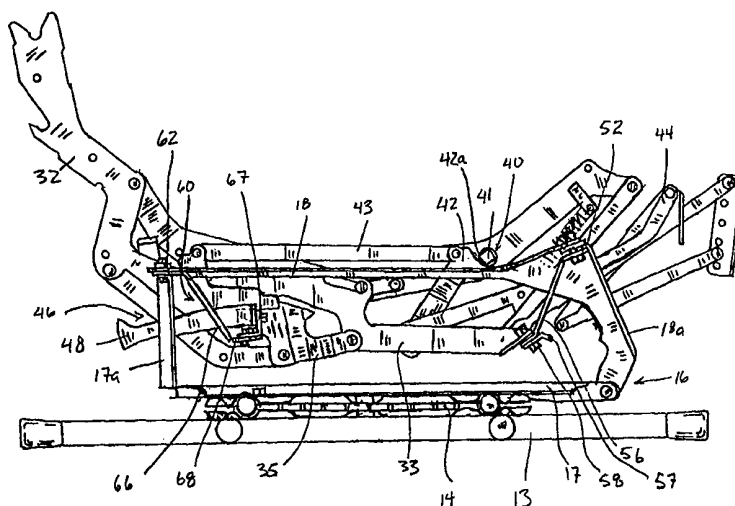




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<p>(21) International Application Number: PCT/US99/17598</p> <p>(22) International Filing Date: 3 August 1999 (03.08.99)</p> <p>(30) Priority Data: 09/132,931 11 August 1998 (11.08.98) US</p> <p>(71) Applicant (for all designated States except US): ROGERS DESIGN [US/US]; P.O. Box 1740, Denton, NC 27239 (US).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): ROGERS, W., Clark [US/US]; P.O. Box 1740, Denton, NC 27239-0722 (US).</p> <p>(74) Agents: CANNON, James, R. et al.; Myers, Bigel, Sibley &amp; Sajovec, P.A., P.O. Box 37428, Raleigh, NC 27627 (US).</p>		<p>(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i></p>

(54) Title: GLIDING SEATING UNIT WITH HINGED GLIDING MEMBERS



(57) Abstract

The gliding seating unit of the present invention comprises: A base (17, 18) configured to rest upon an underlying surface; a seat overlying the base; a unitary front glide member (50), and unitary rear glide member (60). The front glide member is connected with the base (18) and the seat and comprises an upper panel (52) fixed to the base, a lower panel (58) connected with the seat (33), and a gliding panel (56) hingedly attached at an upper end to the upper panel and hingedly attached at a lower end to the lower panel. The rear glide member is connected with the base (17) and the seat and comprises an upper panel fixed to the base, a lower panel connected with the seat, and a gliding panel (66) hingedly attached at an upper end to the upper panel (62) and hingedly attached at a lower end to the lower panel (68). The front and rear glide members are constructed and mounted such that the seat is suspended from the base and is free to glide along a longitudinal path responsive to a longitudinally-directed force, wherein the longitudinal path is defined by motion of the gliding panels of the front and rear glide members. Preferably, the front and rear glide members are formed of a polymeric material, such that the upper and lower panels of the front and rear glide members are connected to the glide panels via "living" hinges.

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## GLIDING SEATING UNIT WITH HINGED GLIDING MEMBERS

### Field of the Invention

The present invention relates generally to seating units, and relates more particularly to gliding seating units.

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### Background of the Invention

For many years, rocking chairs have been popular furniture pieces in the home. The repetitive rocking motion of the chair can be quite relaxing and comforting to a seated occupant. In addition, the appearance of the rocking chair is such that it can be used with a variety of furniture styles, particularly traditional styles with a heavy emphasis on visible wood.

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In recent years, furniture designers have looked for alternatives to rocking chairs that can provide a similarly relaxing repetitive motion. One alternative has been the gliding chair, or "glider", which includes structure that enables the seat portion of the chair to "glide" forwardly and rearwardly relative to its base to mimic generally the rocking motion of a rocking chair. Often the gliding structure comprises a set of swing links (usually two at the front of the chair, and two at the rear) that are pivotally attached at their upper ends to the base and extend downwardly therefrom to attach to a structure, such as a mounting bracket, that is attached to the seat. In this configuration, the seat is suspended from the base and is free to swing forwardly and rearwardly in a double pendulum-type motion in response to a forwardly or rearwardly-directed force applied by a

15

20

seated occupant. The gliding path of the chair is controlled by the configuration and mounting of the swing links. These chairs can be constructed to resemble traditional rocking chairs and thus are quite popular.

Another type of seating unit that has become popular is the recliner chair. Recliners typically include some type of mechanism that, when actuated, causes the seat and backrest of the recliner to pivot relative to the base in order to place an occupant of the seating unit in a reclined position. Also, many recliners include an extendable footrest, or "ottoman," that extends forwardly of the seat and retracts beneath the seat as desired.

Reclining capability has been combined with gliding capability in a single unit to provide a chair that both reclines and glides. This chair includes a reclining mechanism that enables it to move between upright and one or more reclined positions, and further includes the aforementioned swing links attached between the base and the seat, armrests, or mechanism itself to enable the chair to glide. Examples of such chairs are illustrated and described in U.S. Patent Nos. 4,536,029 and 4,544,201, both to Rogers, Jr., the disclosures of which are hereby incorporated herein by reference in their entireties.

Despite their popularity, gliders, and in particular glider-recliners, have proven to have certain shortcomings. One concern with gliders is that the swing links can cause the chair to be somewhat noisy while gliding. Such noise is produced by the interaction between the swing links and the components to which they are mounted; as the swing links pivot, they rub against their respective mounting locations, which can produce squeaking. As a result, manufacturers of gliders typically lubricate these areas heavily. In addition, the rubbing interaction of the swing links against their mounting points can also cause the swing links to "catch" as the surfaces wear. As a result, the occupant of the chair may sense a less smooth gliding motion than would be preferred. The prior art is silent regarding solutions to these problems.

### Summary of the Invention

5 In view of the foregoing, it is an object of the present invention to provide a gliding seating unit that reduces or eliminates noise caused by the interaction of swing links with their mounting locations.

It is also an object of the present invention to provide a gliding seating unit that reduces the tendency of the occupant to sense that the unit is “catching” during gliding.

10 It is a further object of the present invention to provide such a gliding seating unit that also has reclining capability.

These and other objects are satisfied by the present invention, which is directed to a gliding seating unit that employs hinged front and rear glide links to impart gliding motion. More specifically, the gliding seating unit of the present invention comprises: a base configured to reset upon an underlying surface; a seat  
15 overlying the base; a unitary front glide member, and unitary rear glide member. The front glide member is connected with the base and the seat and comprises an upper panel fixed to the base, a lower panel connected with the seat, and a gliding panel hingedly attached at an upper end to the upper panel and hingedly attached at  
20 a lower end to the lower panel. The rear glide member is connected with the base and the seat and comprises an upper panel fixed to the base, a lower panel connected with the seat, and a gliding panel hingedly attached at an upper end to the upper panel and hingedly attached at a lower end to the lower panel. The front and rear glide members are constructed and mounted such that the seat is  
25 suspended from the base and is free to glide along a longitudinal path responsive to a longitudinally-directed force, wherein the longitudinal path is defined by motion of the gliding panels of the front and rear glide members. Preferably, the front and rear glide members are formed of a polymeric material, such that the upper and lower panels of the front and rear glide members are connected to the glide panels  
30 via “living” hinges.

In such a configuration, the glide panels of the front and rear glide members can pivot relative to their respective upper and lower panels without the

rubbing action that accompanies the swing links of prior art gliders. As such, the glider can glide with less noise and without the “catching” action of prior art gliders.

In a preferred embodiment, the gliding seating unit of the present invention is a glider-recliner, and so includes a reclining mechanism attached to the seat. In this embodiment, the lower panels of the front and rear glide members are fixed to the reclining mechanism such that the seat and reclining mechanism are suspended above the base.

### Brief Description of the Drawings

**Figure 1** is a partial perspective view of a frame and a pair of reclining mechanisms for a gliding, reclining chair of the present invention with the upholstery and chair frame removed for clarity.

**Figure 2** is a cutaway side view of the chair of **Figure 1** in its upright position with upholstery indicated in phantom lines.

**Figure 2A** is an enlarged partial side view of the stop linkage of the chair of **Figure 1** with the chair in the upright position.

**Figure 3** is a cutaway side view of the chair of **Figure 1** in the TV position.

**Figure 3A** is an enlarged partial side view of the stop linkage of the chair of **Figure 1** with the chair in the TV position.

**Figure 4** is a section view taken along lines 4—4 of **Figure 1** showing the glide members of the chair.

**Figure 5** is an exploded view of the base and glide members of the chair of **Figure 1**.

**Figure 6** is an enlarged schematic side view of the glide members of the chair of **Figure 1** illustrating the orientation of the glide members when the glide members are suspended from the frame (when the chair is in the upright position) and the orientations of the glide members when the chair is in the TV position.

### Detailed Description of the Invention

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

The present invention is directed to a gliding, reclining chair having  
10 a stationary base, a seat, and a backrest. As used herein, the terms "forward", "front" and derivatives thereof refer to the direction defined by a vector extending from the backrest toward the seat parallel to the underlying surface. Conversely, the terms "rearward" and derivatives thereof refer to the direction directly opposite the forward direction; i.e., the rearward direction is defined by a vector that extends  
15 from the seat toward the backrest parallel to the underlying surface. The forward and rearward directions together comprise the "longitudinal" directions relative to the chair. The term, "outward" and derivatives thereof refer to the direction defined by a vector originating in the center of the seat and extending in the plane of the underlying surface and perpendicular to the forward and rearward directions.  
20 The terms "inboard", "inward" and derivatives thereof refer to the direction directly opposite to the lateral direction as defined hereinabove. The outward and inward directions together comprise the "lateral" directions relative to the chair.

In addition, mechanisms for moving portions of the seating unit illustrated herein between retracted and extended positions are illustrated as a  
25 series of pivotally interconnected links. Those skilled in this art will appreciate that the pivots between links illustrated herein can take a variety of configurations, such as pivot pins, rivets, bolt and nut combinations, and the like, any of which would be suitable for use with the present invention.

Referring now to the drawings, a gliding, reclining chair, designated  
30 broadly at 10, is illustrated in **Figures 1** through 6. As best seen in **Figures 1, 2** and 4, the chair 10 includes a base 12 configured to rest on an underlying surface, a seat 22 positioned above the base 12, a backrest 24 positioned rearward of the seat

22, an extendable ottoman 26 that retracts to a position below the forward portion of the seat 22, a pair of three-way reclining mechanisms 30a, 30b, a front glide member 50 and a rear glide member 60. These components and their interrelationships are described in more detail below.

5 Referring to **Figure 5**, the base 12 includes a spider wheel 13 that rests on the underlying surface, a round swivel unit 14 attached to the top of the spider wheel 13, and a frame 16 fixed to the top of the swivel unit 14. As best seen in **Figures 4 and 5**, the frame 16 includes a pair of base members 17 fixed to the swivel unit 14 having upright portions 17a extending upwardly from the rear  
10 ends thereof. The frame 16 also includes a pair of top members 18 that extend forwardly from the upright portion 17a to a position beyond the front portion of the swivel unit 14, then extend downwardly therefrom with upright portions 18a that meet the front ends of the base members 17. A mounting bracket 20 is fixed to the top rear portion of each of the top members 18; a stop pin 20a extends outwardly  
15 from each mounting bracket 20.

Referring again to **Figure 1**, the three-way reclining mechanisms 30a, 30b are positioned outwardly from the frame 16. As used herein, a “three-way” reclining mechanism indicates that the mechanism controls the movement of the seat 22 and backrest 24 between an upright position (see **Figure 2**), an  
20 intermediate “TV” position (**Figure 3**), in which the ottoman 26 is extended in front of the seat 22, and the backrest 24 and the seat 22 remain in the same positions relative to one another, and a fully reclined position (not shown), in which the backrest 44 reclines (*i.e.*, takes a shallower angle to the underlying surface) relative to the seat 22 and the ottoman 26 remains extended. The structure  
25 and operation of three-way mechanisms are well known in this art and need not be described in detail herein; those skilled in this art will recognize that other three-way reclining mechanisms can also be employed with chairs of the present invention. Exemplary reclining mechanisms include those illustrated in U.S. Patent Nos. 4,319,780 and 4,519,647 to Rogers. Also, some two-way mechanisms  
30 (*i.e.*, those that cause a backrest rigidly fixed to the seat to move between upright, TV, and fully reclined positions) and some one-way mechanisms (those that cause



a backrest rigidly fixed to the seat to move between upright and reclined positions) can also be employed in chairs of the present invention.

The three-way reclining mechanisms **30a** and **30b** are mirror images of one another about a vertical, longitudinally-extending plane that bisects the chair  
5 10 between the reclining mechanisms **30a**, **30b**. As such, only the reclining mechanism **30a** will be described in detail herein. Those skilled in this art will recognize that this discussion is equally applicable to the reclining mechanism **30b**.

Referring to **Figures 2** and **3**, the reclining mechanism **30a** comprises a number of pivotally interconnected links that enable it to move the  
10 seat **22** and backrest **24** relative to the base **12** in the desired fashion. These include a seat link **31** to which the seat **22** is attached and a backrest post **32** to which the backrest **24** is attached. A carrier link **33** extends from a pivotal interconnection with the backrest post **32** downwardly and forwardly to terminate at a point below and rearwardly of the mounting flange **19** of the longitudinal  
15 member **17b**. The carrier link **33** includes an inwardly-extending mounting tab **34** at its forward end. The reclining mechanism **30a** also includes a connecting link **35** that is pivotally connected at its front portion to the carrier link **33** and extends upwardly and rearwardly therefrom. The connecting link **35** includes a mounting tab **36** that extends inwardly. The reclining mechanism **30a** further includes a  
20 pantographic ottoman linkage **44** for extending the ottoman **26** forwardly of the seat **22** when the chair **10** is in its TV and fully reclined positions. The operation of the ottoman linkage **44** will be understood by those skilled in this art and need not be described in detail herein.

Best seen in **Figure 4**, the reclining mechanism **30a** also includes an  
25 actuation linkage **40** that controls the movement of the reclining mechanism **30a** between its upright position and the TV position. The actuation linkage **40** includes a drive axle **41** of square cross section that extends through an aperture in the seat link **31**, and further includes a bell crank **42** having an inwardly-extending flange **42a** that rests against and is fixed to the lower rearward face of the drive axle **41**.  
30 The bell crank **42** is pivotally interconnected at its upper end to the front end of a transition link **43**, and is further pivotally interconnected at the lower end to an ottoman drive link **45** that is interconnected with the ottoman linkage **44**. Rotation

of a handle (not shown) attached at one end of the drive axle 41 causes the drive axle 41 to rotate (counterclockwise in the view shown in **Figure 4**). Rotation of the drive axle 41 drives the bell crank 42 to rotate to the position illustrated in **Figure 3**. Such rotation by the bell crank 42 forces the ottoman linkage 44 to  
5 extend the ottoman 26 and place the chair 10 in the TV position. From this position, the chair 10 can be moved to the fully reclined position by the occupant pushing rearwardly against the backrest.

Referring now to **Figures 4, 5 and 6**, the reclining mechanism 30a, and in turn the seat 22 and backrest 24, are interconnected with the base 12 via the  
10 front and rear glide members 50, 60. The front glide member 50 is a unitary component formed of a polymeric material such as polypropylene or nylon, and includes an upper panel 52, a gliding panel 56, and a lower panel 58, each of which is between about 0.15 and 0.25 inches in thickness, with a thickness of about 0.1875 inches being preferred. As shown in **Figure 6**, the upper panel 52 is  
15 separated from the gliding panel 56 by an upper recess 54, and the gliding panel 56 is separated from the lower panel 58 by a lower recess 59. The upper and lower recesses 54, 59, each of which has a depth of between about 0.09 and 0.12 inches, define the pivot axes of so-called "living hinges" that enable the gliding panel 56 to be pivoted repeatedly relative to the upper panel 52 and the lower panel 58.  
20 Notably, the upper and lower recesses 54, 59 face in generally opposite directions; i.e., the upper access 54 is formed into one surface of the gliding panel 56, and the lower recess is formed in the opposite surface of the gliding panel 56. Those skilled in the design of living hinges will appreciate that virtually any design which a material appropriate/or living hinges is formed with a thinner "hinge" section  
25 between two thicker "non-hinge" section may be suitable for use with the present invention. Also, other polymeric materials, including those reinforced with an organic or inorganic filler or reinforcing material, can be used with the present invention.

As can be seen in **Figures 4 and 5**, the upper panel 52 is fixed to the  
30 underside of the top members 18 with a spacer bar 53 that extends transversely between the top members 18 positioned between the upper panel 52 and the top members 18. The upper recess 54 faces generally rearwardly and slightly

upwardly. The lower panel 58 is fixed to a front cross member 57 that extends transversely between the mounting tabs 34 of the carrier links 33 of the reclining mechanisms 30a, 30b such that the lower recess 59 faces generally forwardly and downwardly. At rest, the gliding panel 56 slopes downwardly and slightly rearwardly from the upper panel 52 (Figures 4 and 6).

Referring to Figures 4 through 6, the unitary, polymeric rear glide member 60 includes an upper panel 62, a gliding panel 66 and a lower panel 68, with the upper and gliding panels 62, 66 being separated by an upper recess 64, and the gliding and lower panels 66, 68 being separated by a lower recess 69. The rear glide member 60 is also formed of a polymeric material. As with the front glide member 50, the presence of the upper and lower recesses 64, 69 in the rear glide member 60 forms living hinges that enable the gliding panel 66 to pivot repeatedly relative to the upper and lower panels 62, 68. The upper panel 62 is fixed to the underside of the rear portion of the top members 18 mounting flange 20 of the base 12, such that the upper recess 64 faces generally upwardly and forwardly. The lower panel 68 is fixed to a rear cross member 67 that extends transversely between the mounting tabs 36 of the connecting links 35 of the reclining mechanisms 30a, 30b. In this configuration, the gliding panel 66 slopes downwardly and slightly forwardly in extending from the upper panel 62.

In the illustrated configuration, the seat 22, backrest 24, ottoman 26 and reclining mechanisms 30a, 30b are suspended from the frame 16 by the front and rear glide members 50, 60. As such, these components are free to glide along a longitudinal path defined by the gliding panels 56, 66 of the front and rear glide members 50, 60 as they pivot relative to their respective upper and lower panels (see Figure 6).

In addition, the reclining mechanism 30a includes a stop linkage 46 coupled thereto. The stop linkage 46 (Figures 2A and 5) includes an extender bar 48 that is fixed to and extends rearwardly from the rear cross member 67 that is attached between the mounting tabs 36 of the connecting link 35. When the reclining mechanisms 30a, 30b move the chair 10 from the upright position of Figure 2 to the TV position of Figure 3, the connecting link 35 rotates (clockwise in the view in Figures 2 and 3), such that the extender bar 48 also rotates

clockwise. The rotation of the extender bar 48 ceases when it strikes a stop pin 49 that extends outwardly from the longitudinal member 17b. Once in this position, the extender bar 48 prevents the seat 22 and backrest 24 from gliding relative to the base 12 and frame 16, thereby stabilizing the chair 10 when it is in either the TV or fully reclined positions.

The advantages provided by the front and rear gliding members 50, 60 are many. First, because of the nature of the living hinge configuration of the gliding members 50, 60, the noise and "catching" problems sometimes associated with prior gliders can be eliminated, as there are no components that have rubbing surfaces in the front and rear gliding members 50, 60. Second, the gliding members 50, 60 can be manufactured easily by extrusion or injection molding, each of which can provide consistent, inexpensive components. Third, because as illustrated the gliding members span the distance between the reclining mechanisms 30a, 30b on either side of the chair 10, there is no need for additional cross members that interconnect separate glide links in order to synchronize and stabilize their motion. Fourth, the resistance to the gliding motion provided by the living hinges can be adjusted by simply adjusting the depth of the recess in the glide members, changing materials, or including (as illustrated) apertures in the glide members 50, 60 along the pivot axes. Fifth, these performance advantages can be achieved in almost any gliding seating unit currently being manufactured that employs swing links as the gliding mechanism, as the gliding members can simply be mounted to replace the swing links and provide the same motion to the chair.

It should also be appreciated by those skilled in this art that, although a glider-recliner chair is illustrated and described herein, other seating units, including those that lack reclining capability and those that serve multiple occupants, can also benefit from the use of the concepts of the present invention.

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly,

all such modifications are intended to be included within the scope of this invention as defined in the claims. The invention is defined by the following claims, with equivalents of the claims to be included therein. In the claims, means-plus-function clauses are intended to cover the structures described herein as  
5 performing the recited function and not only structural equivalents but also equivalent structures.

## THAT WHICH IS CLAIMED IS:

1. A gliding seating unit, comprising:
  - a base configured to reset upon an underlying surface;
  - a seat overlying said base;
  - a unitary front glide member connected with said base and said seat,
  - 5 said front glide member comprising an upper panel fixed to said base, a lower panel connected with said seat, and a gliding panel hingedly attached at an upper end to said upper panel and hingedly attached at a lower end to said lower panel;
  - a unitary rear glide member connected with said base and said seat,
  - said front glide member comprising an upper panel fixed to said base, a lower
  - 10 panel connected with said seat, and a gliding panel hingedly attached at an upper end to said upper panel and hingedly attached at a lower end to said lower panel;
  - said front and rear glide members being constructed and mounted such that said seat is suspended from said base and is free to glide along a
  - longitudinal path responsive to a longitudinally-directed force, the longitudinal
  - 15 path being defined by motion of said gliding panels of said front and rear glide members.
2. The gliding unit defined in Claim 1, wherein said front and rear glide members are each formed from a polymeric material.
3. The gliding unit defined in Claim 2, wherein said polymeric material is propylene.
4. The gliding unit defined in Claim 1, wherein each of said front and rear glide members includes a first recess between respective upper and gliding panels and a second recess between respective gliding and lower panels, said first and second recesses of said front and rear gliding members defining pivot
- 5 axes about which said gliding panels pivot relative to said base and said seat.
5. The gliding unit defined in Claim 4, wherein said first and

second recesses of said front gliding member face in generally opposite directions, and said first and second recesses of said rear gliding member face in generally opposite directions.

6. The gliding unit defined in Claim 1, further comprising a reclining mechanism attached to said seat and to said lower panels of said front and rear gliding members, said reclining mechanism configured to move said seat relative to said base between upright and reclined positions.

7. The gliding unit defined in Claim 6, further comprising a backrest positioned rearwardly of said seat, and wherein said reclining mechanism is a three-way reclining mechanism attached to said seat and said backrest.

8. The gliding unit defined in Claim 6, further including a retractable stop linkage that is moveable between a retracted position that allows said seat to glide relative to said base and an extended position that prevents said seat from gliding relative to said base, said stop linkage being coupled to said  
5 reclining mechanism such that said stop linkage takes its retracted position when said reclining mechanism is in the upright position and said stop linkage takes its extended position when said reclining mechanism is in the reclined position.

9. The gliding unit defined in Claim 7, wherein said lower panel of said front glide member is fixed to a carrier link of said reclining mechanism.

10. The gliding unit defined in Claim 7, wherein said lower panel of said rear glide member is fixed to a connecting link of said reclining mechanism.

11. A gliding seating unit, comprising:  
a base configured to reset upon an underlying surface;

- a seat overlying said base;
- 5 a unitary front glide member formed of a polymeric material and connected with said base and said seat, said front glide member comprising an upper panel fixed to said base, a lower panel connected with said seat, and a gliding panel positioned between said upper and lower panels and hingedly attached thereto with respective upper and lower living hinges;
- 10 a unitary rear glide member formed of a polymeric material and connected with said base and said seat, said front glide member comprising an upper panel fixed to said base, a lower panel connected with said seat, and a gliding panel positioned between said upper and lower panels and hingedly attached thereto with respective upper and lower living hinges;
- 15 said front and rear glide members being constructed and arranged such that said seat is suspended from said base and is free to glide along a longitudinal path responsive to a longitudinally-directed force, the longitudinal path being defined by motion of said gliding panels of said front and rear glide members.

12. The gliding unit defined in Claim 11, wherein said polymeric material is polypropylene.

13. The gliding unit defined in Claim 11, further comprising a reclining mechanism attached to said seat and to said lower panels of said front and rear gliding members, said reclining mechanism configured to move said seat relative to said base between upright and reclined positions.

14. The gliding unit defined in Claim 13, further comprising a backrest positioned rearwardly of said seat, and wherein said reclining mechanism is a three-way reclining mechanism attached to said seat and said backrest.

15. The gliding unit defined in Claim 13, further including a retractable stop linkage that is moveable between a retracted position that allows said seat to glide relative to said base and an extended position that prevents said



5 seat from gliding relative to said base, said stop linkage being coupled to said reclining mechanism such that said stop linkage takes its retracted position when said reclining mechanism is in the upright position and said stop linkage takes its extended position when said reclining mechanism is in the reclined position.

16. The gliding unit defined in Claim 14, wherein said lower panel of said front glide member is fixed to a carrier link of said reclining mechanism.

17. The gliding unit defined in Claim 14, wherein said lower panel of said rear glide member is fixed to a connecting link of said reclining mechanism.

18. A gliding reclining seating unit, comprising:  
a base configured to reset upon an underlying surface;  
a seat overlying said base;  
a backrest positioned rearwardly of said seat;  
5 a reclining mechanism attached to said seat, said reclining mechanism configured to move said seat relative to said base between upright and reclined positions;  
a unitary front glide member attached to said base and said reclining mechanism, said front glide member comprising an upper panel fixed to said base,  
10 a lower panel fixed to said reclining mechanism, and a gliding panel hingedly attached at an upper end to said upper panel and hingedly attached at a lower end to said lower panel;  
a unitary rear glide member attached to said base and said reclining mechanism, said rear glide member comprising an upper panel fixed to said base, a  
15 lower panel fixed to said reclining mechanism, and a gliding panel hingedly attached at an upper end to said upper panel and hingedly attached at a lower end to said lower panel;  
said front and rear glide members being constructed and arranged such that said seat and said reclining mechanism are suspended from said base and

20 is free to glide along a longitudinal path responsive to a longitudinally-directed force, the longitudinal path being defined by motion of said gliding panels of said front and rear glide members.

19. The gliding unit defined in Claim 18, wherein said front and rear glide members are each formed from a polymeric material.

20. The gliding unit defined in Claim 19, wherein said polymeric material is polypropylene.

21. The gliding unit defined in Claim 18, wherein each of said front and rear glide members includes a first recess between respective upper and gliding panels and a second recess between respective gliding and lower panels, said first and second recesses of said front and rear gliding members defining pivot  
5 axes about which said gliding panels pivot relative to said base and said seat.

22. The gliding unit defined in Claim 21, wherein said first and second recesses of said front gliding member face in generally opposite directions, and said first and second recesses of said rear gliding member face in generally opposite directions.

23. The gliding unit defined in Claim 18, wherein said reclining mechanism is a three-way reclining mechanism attached to said seat and said backrest.

24. The gliding unit defined in Claim 18, further including a retractable stop linkage that is moveable between a retracted position that allows said seat to glide relative to said base and an extended position that prevents said seat from gliding relative to said base, said stop linkage being coupled to said  
5 reclining mechanism such that said stop linkage takes its retracted position when said reclining mechanism is in the upright position and said stop linkage takes its extended position when said reclining mechanism is in the reclined position.

25. The gliding unit defined in Claim 18, wherein said lower panel of said front glide member is fixed to a carrier link of said reclining mechanism.

26. The gliding unit defined in Claim 18, wherein said lower panel of said rear glide member is fixed to a connecting link of said reclining mechanism.

27. A gliding reclining seating unit, comprising:  
a base configured to reset upon an underlying surface;  
a seat overlying said base;  
a backrest positioned rearwardly of said seat;  
5 a reclining mechanism attached to said seat, said reclining mechanism configured to move said seat and said backrest relative to said base between upright and reclined positions;  
a unitary front glide member formed of a polymeric material and connected with said base and said reclining mechanism, said front glide member  
10 comprising an upper panel fixed to said base, a lower panel fixed to said reclining mechanism, and a gliding panel positioned between said upper and lower panels and hingedly attached thereto with respective upper and lower living hinges;  
a unitary rear glide member formed of a polymeric material and connected with said base and said reclining mechanism, said rear glide member  
15 comprising an upper panel fixed to said base, a lower panel fixed to said reclining mechanism, and a gliding panel positioned between said upper and lower panels and hingedly attached thereto with respective upper and lower living hinges;  
said front and rear glide members being constructed and arranged  
such that said seat is suspended from said base and is free to glide along a  
20 longitudinal path responsive to a longitudinally-directed force, the longitudinal path being defined by motion of said gliding panels of said front and rear glide members.

28. The gliding unit defined in Claim 28, wherein said polymeric material is polypropylene.

29. The gliding unit defined in Claim 28, wherein said reclining mechanism is a three-way reclining mechanism attached to said seat and said backrest.

30. The gliding unit defined in Claim 28, further including a retractable stop linkage that is moveable between a retracted position that allows said seat to glide relative to said base and an extended position that prevents said seat from gliding relative to said base, said stop linkage being coupled to said  
5 reclining mechanism such that said stop linkage takes its retracted position when said reclining mechanism is in the upright position and said stop linkage takes its extended position when said reclining mechanism is in the reclined position.

31. The gliding unit defined in Claim 30, wherein said lower panel of said front glide member is fixed to a carrier link of said reclining mechanism.

32. The gliding unit defined in Claim 30, wherein said lower panel of said rear glide member is fixed to a connecting link of said reclining mechanism.

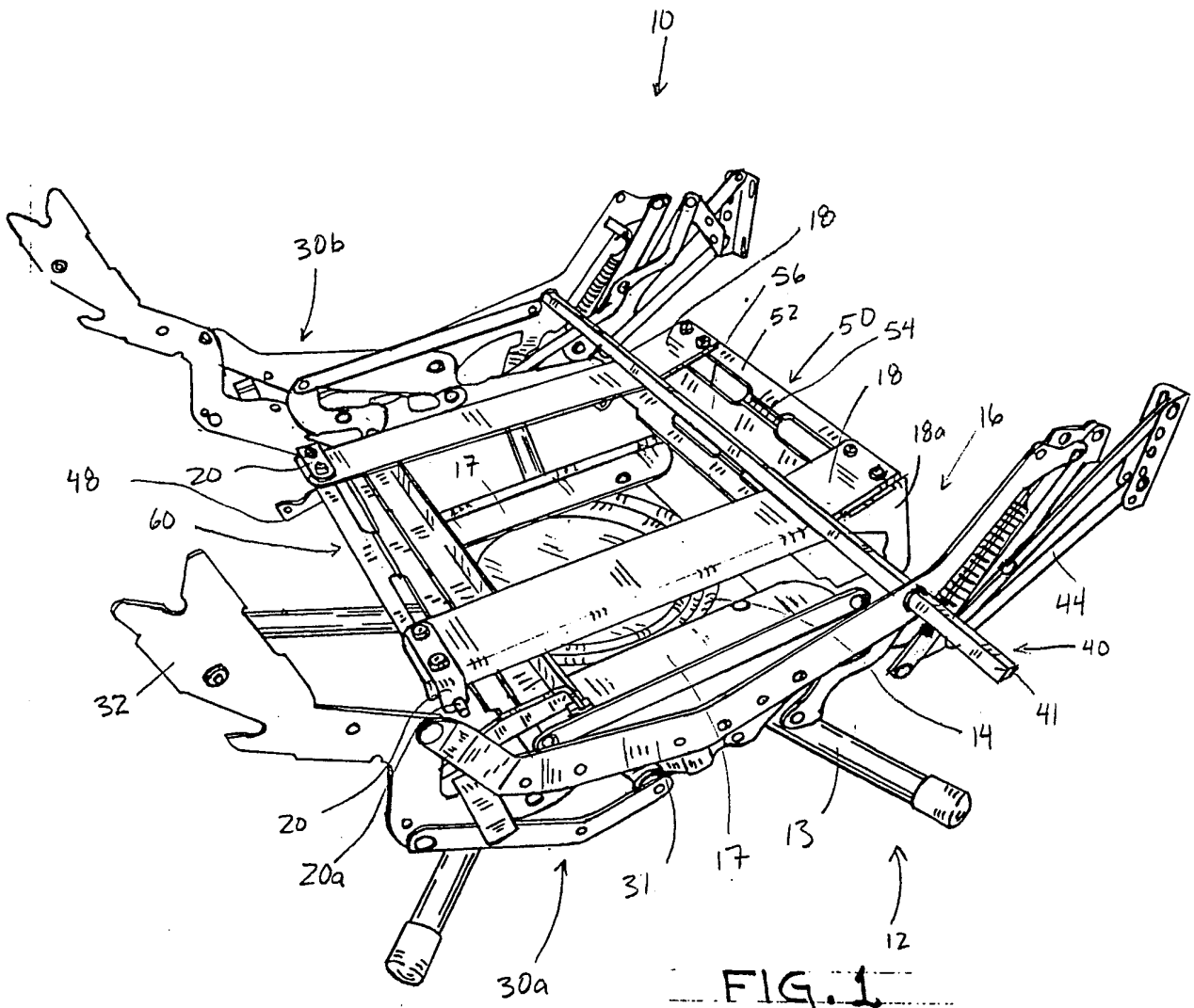
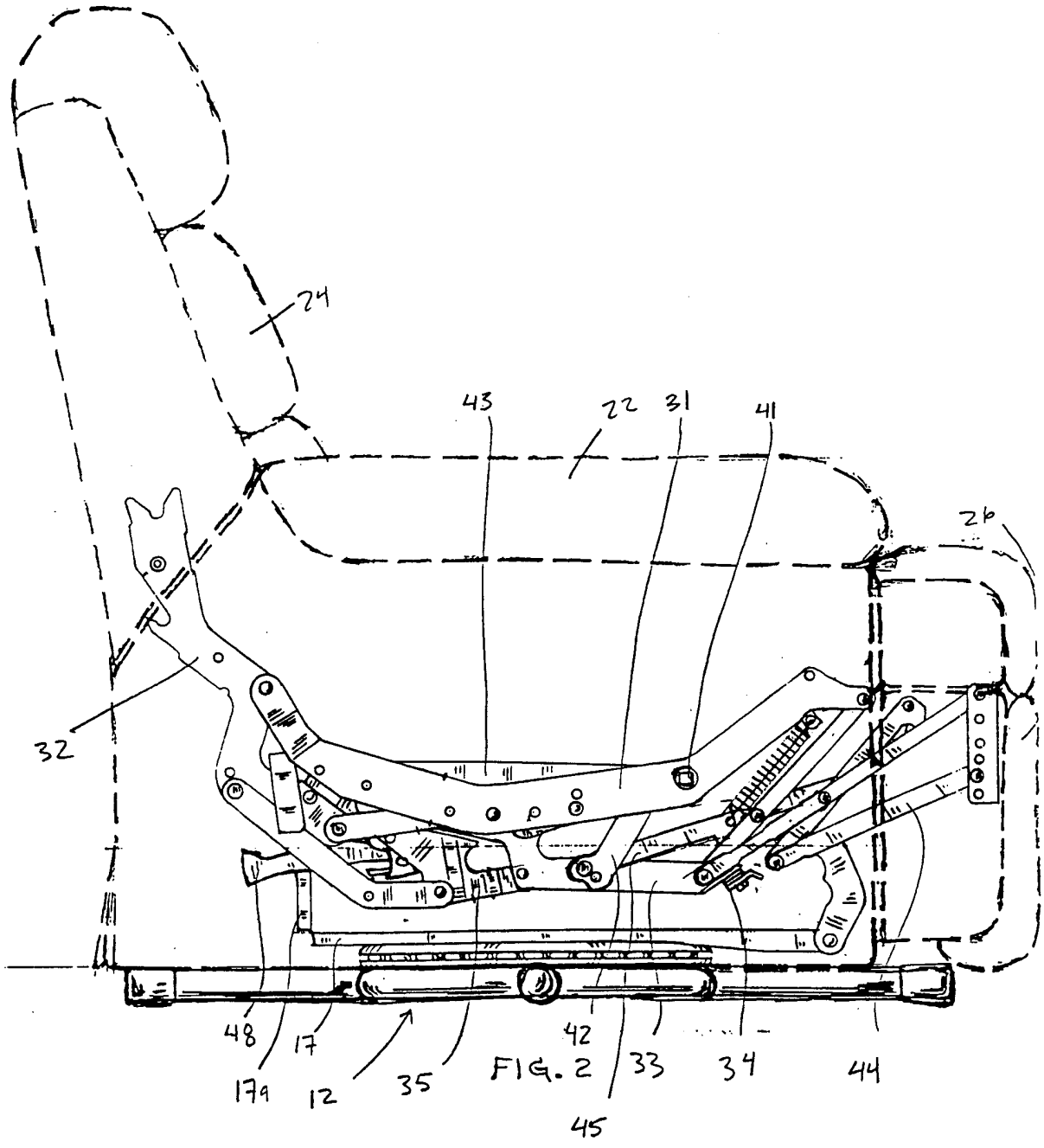
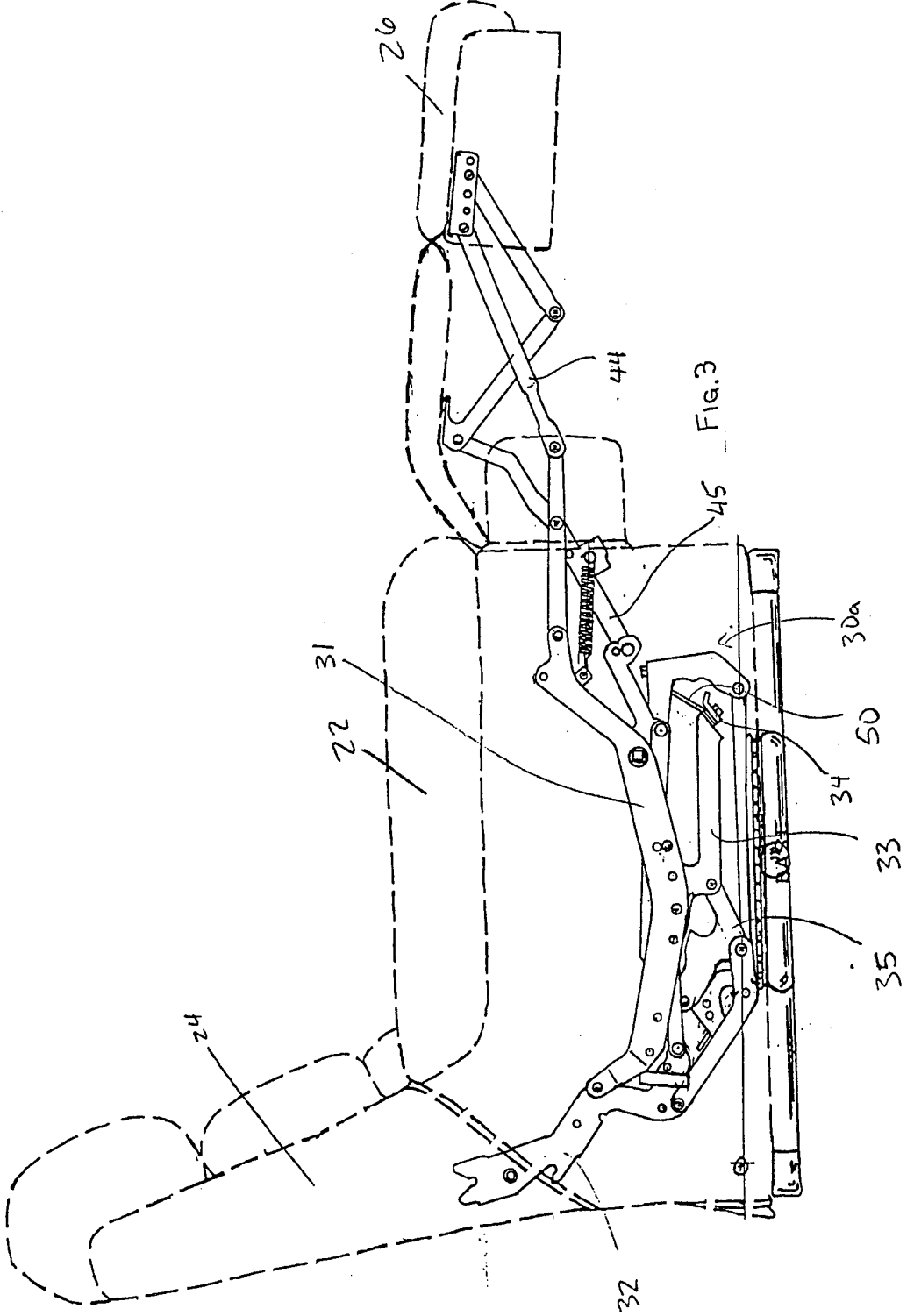


FIG. 1





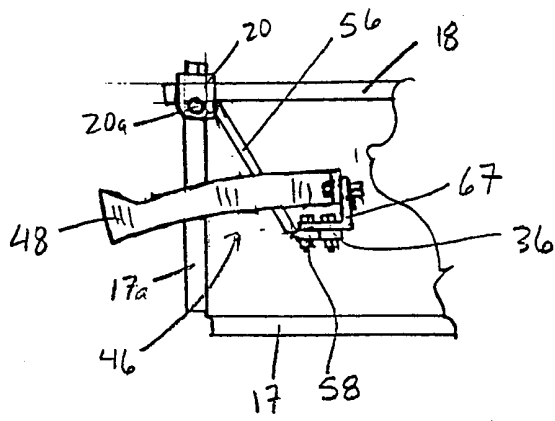


FIG. 2A

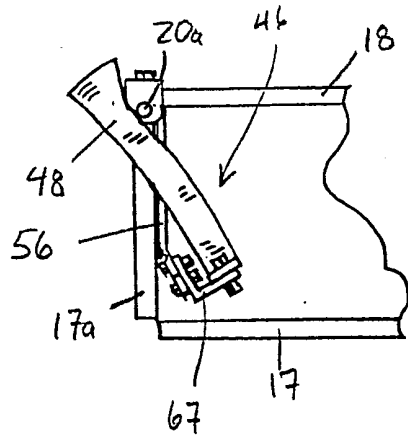
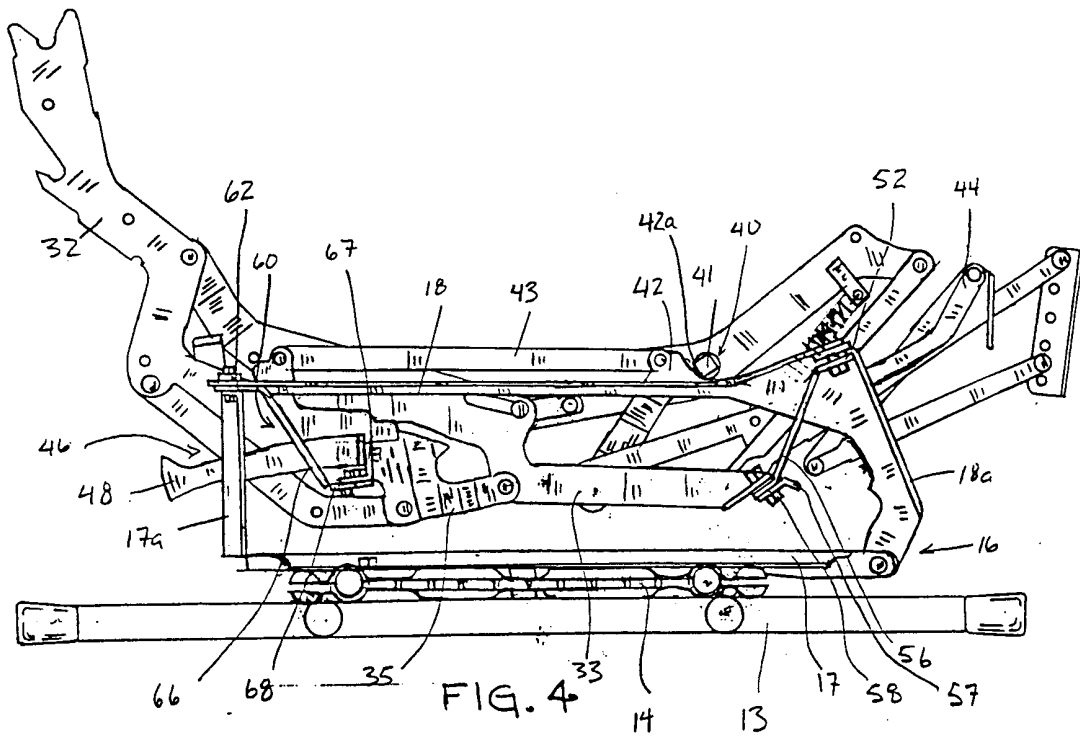
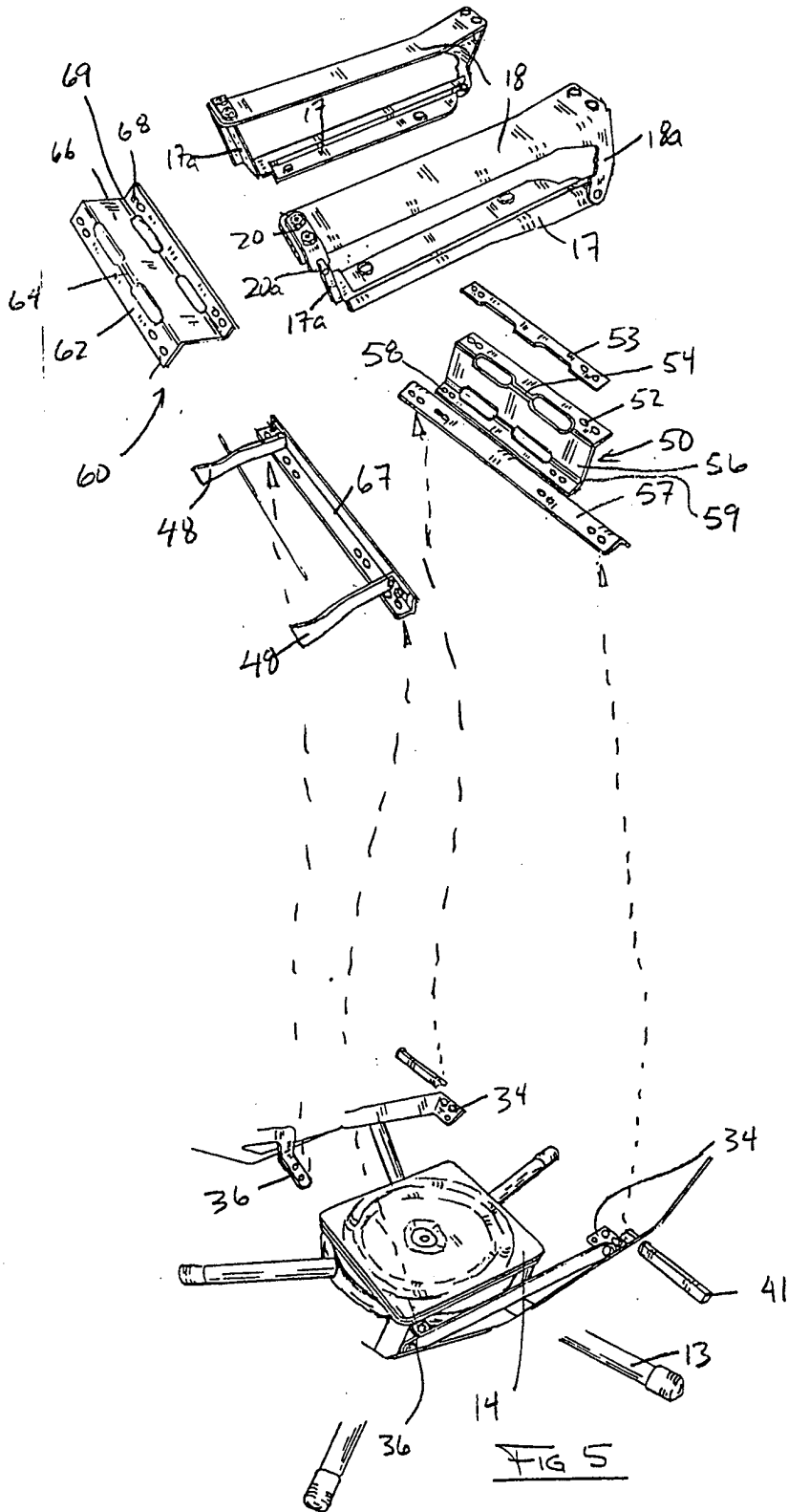


FIG. 3A







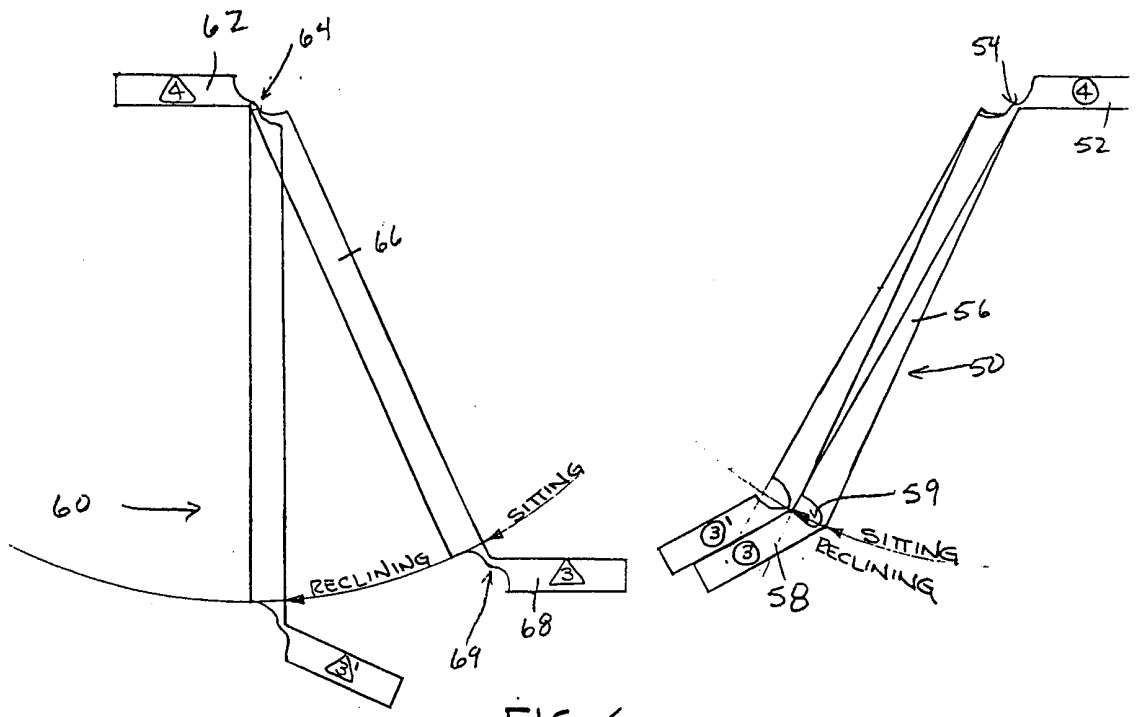


FIG. 6

# INTERNATIONAL SEARCH REPORT

International Application No

RU/US 99/17598

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 A47C3/02 A47C1/035

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)  
 IPC 7 A47C

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

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category <sup>o</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 91 15 439 U (PÜRNER, CHRISTOPH) 7 May 1992 (1992-05-07) page 5, paragraph 2; figure 1 ---	1
A	WO 98 16137 A (KOMOROWSKI KARL J ;Z BOY INC (US); WRIGHT DENNIS W (US); LAPOINTE) 23 April 1998 (1998-04-23) page 3, line 6 - line 9 page 12, line 8 - line 12; claim 11; figure 1 ---	1
A	WO 97 39662 A (SUNLITE CASUAL FURNITURE INC) 30 October 1997 (1997-10-30) page 4, line 1 - line 11 ---	2
	-/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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

24 November 1999

Date of mailing of the international search report

01/12/1999

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Joosting, T

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/17598

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 97 14336 A (Z BOY INC ;LAPOINTE LARRY P (US); FINZEL KEN K (US); SAUL JONATHAN)                      24 April 1997 (1997-04-24)                      figure 2</p> <p style="text-align: center;">---</p>	1
A	<p>US 4 519 647 A (ROGERS JR WALTER C)                      28 May 1985 (1985-05-28)                      cited in the application                      page 2, line 7 - line 28; figures 3,7</p> <p style="text-align: center;">-----</p>	6,7,13, 14,23,29

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/17598

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 9115439 U	07-05-1992	AT 128334 T	15-10-1995
		AU 672587 B	10-10-1996
		AU 2990592 A	01-07-1993
		CA 2084822 A	13-06-1993
		DE 59203837 D	02-11-1995
		EP 0546461 A	16-06-1993
		ES 2082336 T	16-03-1996
		JP 7213372 A	15-08-1995
		US 5397163 A	14-03-1995
WO 9816137 A	23-04-1998	US 5806921 A	15-09-1998
		AU 3894197 A	11-05-1998
		DE 19782055 T	12-08-1999
		GB 2333228 A	21-07-1999
WO 9739662 A	30-10-1997	NONE	
WO 9714336 A	24-04-1997	AU 7436396 A	07-05-1997
		CA 2234842 A	24-04-1997
		US 5765913 A	16-06-1998
US 4519647 A	28-05-1985	CA 1233103 A	23-02-1988
		US RE33704 E	01-10-1991