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Cabrera et al.

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(54) **SLEEPER SOFA**

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(73) Assignee: **Louis Rodriguez**, Bonita, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

(63) Continuation of application No. 13/672,516, filed on Nov. 8, 2012, now Pat. No. 8,881,325, which is a continuation of application No. 13/436,674, filed on Mar. 30, 2012, now Pat. No. 8,321,971, which is a

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(51) **Int. Cl.**
A47C 17/13 (2006.01)
A47C 17/17 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A47C 17/17*** (2013.01); ***A47C 17/132*** (2013.01); ***A47C 17/161*** (2013.01); ***A47C 17/162*** (2013.01); ***A47C 17/163*** (2013.01); ***A47C 17/165*** (2013.01)

(58) **Field of Classification Search**
CPC A47C 7/13; A47C 17/13
USPC 5/13, 37.1, 38, 41, 42.1, 47, 48, 53.1, 5/56, 59.1
See application file for complete search history.

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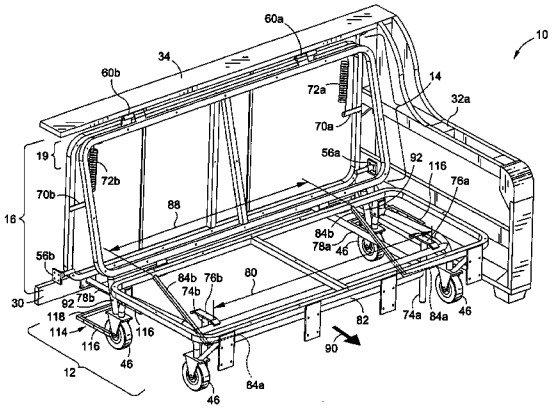
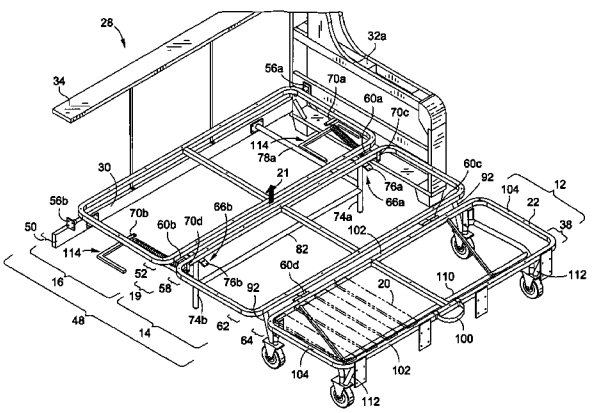
(57) **ABSTRACT**

A convertible sofa-bed which is easy to convert between a sofa configuration and a bed configuration is provided. From a sofa configuration, a buttock-foot member may be pulled outward. Simultaneously, a head rest member and back rest member which are initially at a generally vertical position are traversed to a generally horizontal position. When the buttock-foot member is fully traversed outward (i.e., extended position), the head rest member, back rest member and the buttock-foot member are generally substantially co-planar and generally horizontal. This provides a firm bed surface. From the bed configuration, head rest member and the back rest member may be buckled to allow the buttock-foot member to be pushed inward. The buttock-foot member is then pushed fully inward (i.e., retracted position) until the head rest member and the back rest member are in the generally vertical position with the buttock-foot member and back rest member forming a seat.

17 Claims, 7 Drawing Sheets





Related U.S. Application Data

continuation of application No. 13/085,403, filed on Apr. 12, 2011, now Pat. No. 8,225,439, which is a continuation of application No. 12/001,810, filed on Dec. 13, 2007, now Pat. No. 7,945,974.

(60) Provisional application No. 61/005,311, filed on Dec. 4, 2007, provisional application No. 60/975,759, filed on Sep. 27, 2007.

(51) **Int. Cl.**

A47C 17/16	(2006.01)
A47C 17/165	(2006.01)

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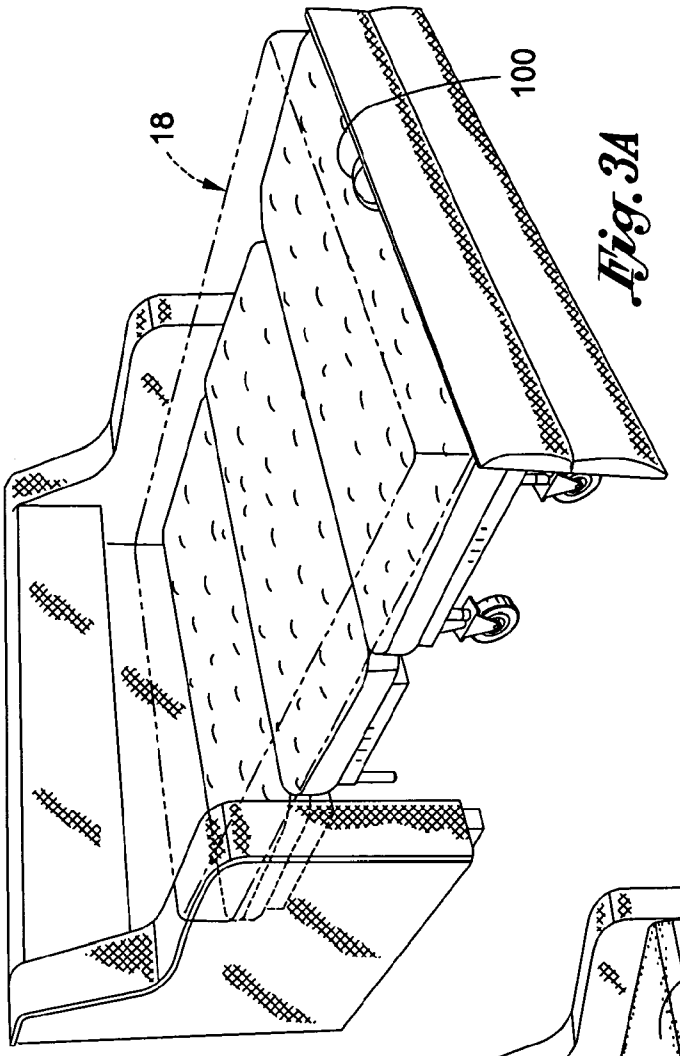


Fig. 3A

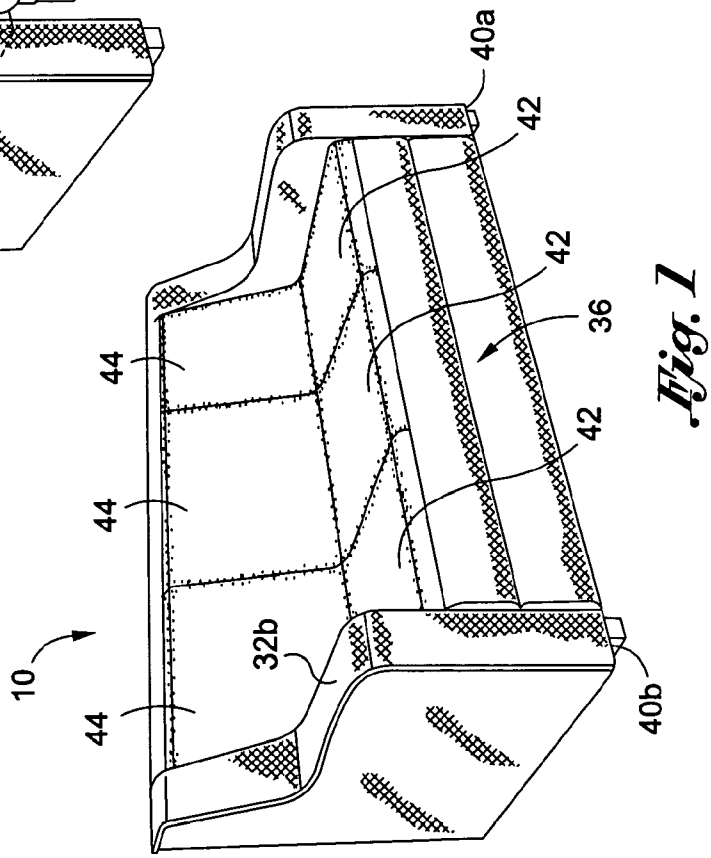
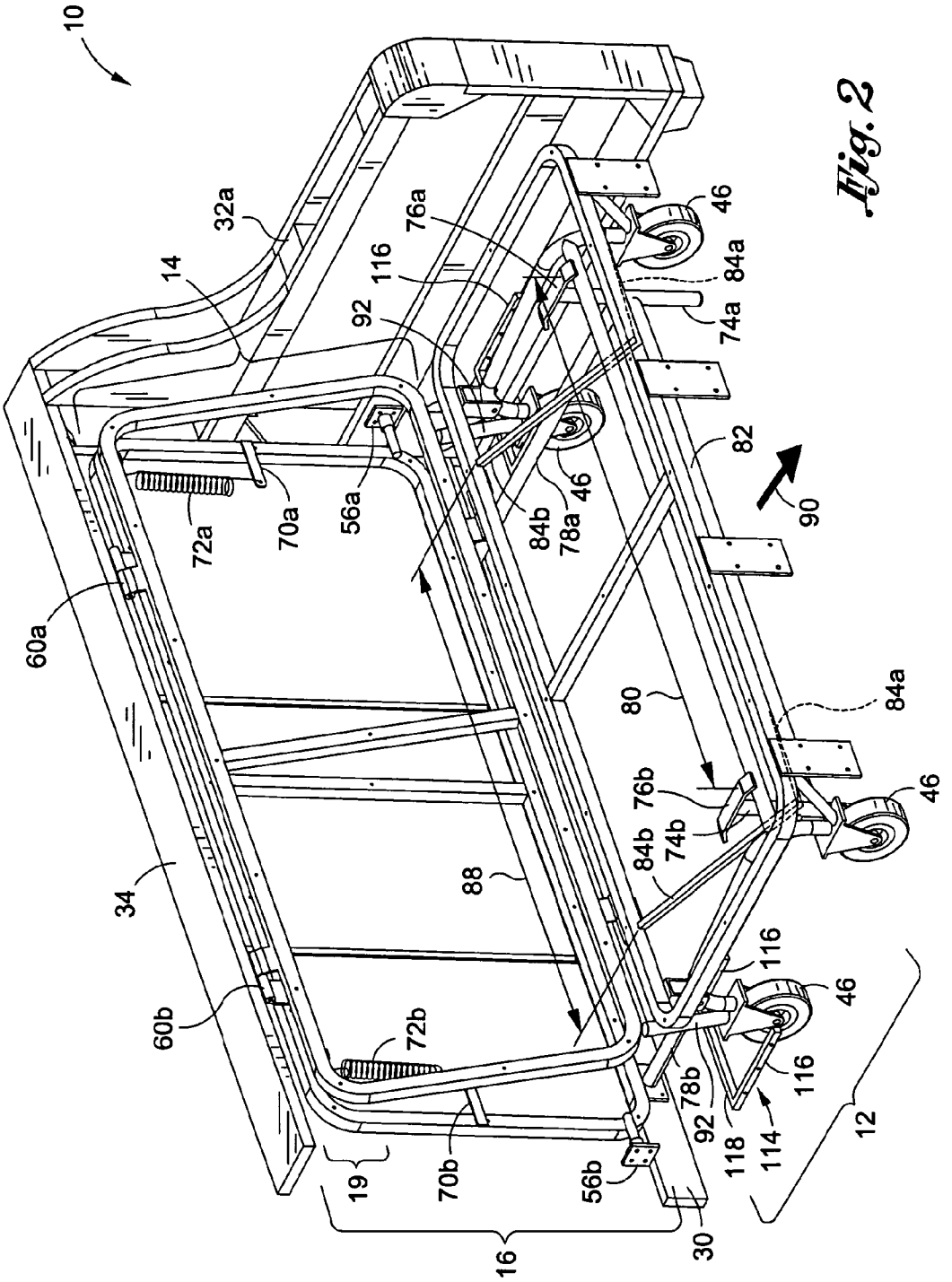


Fig. 1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74a
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56a
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80
84a
76b
46
74b
84b
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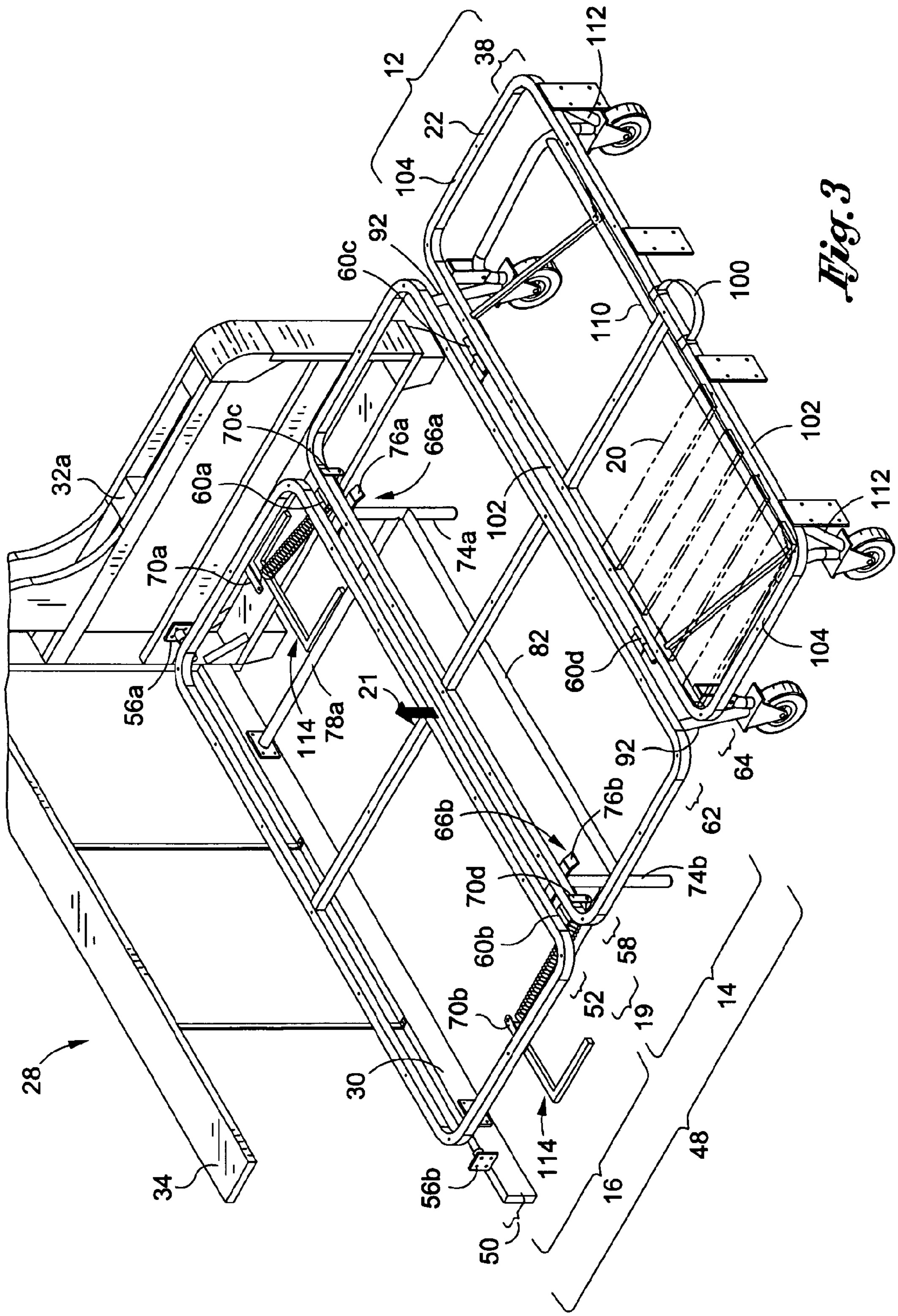
70b
56b
16
30

Fig. 2



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66a
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112
70a
82
104
60d
56a
114
78a
21
92
64
62
66b
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56b
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Fig. 3

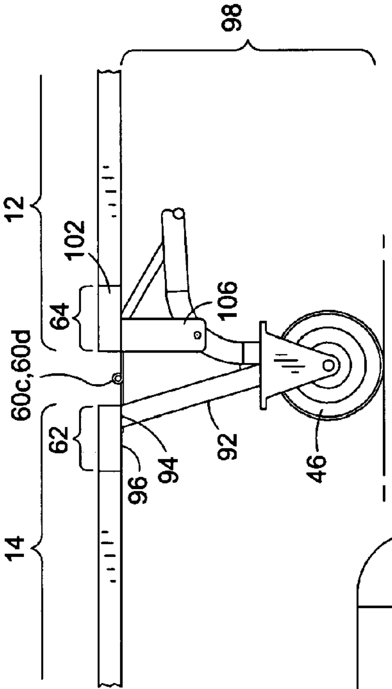
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Fig. 4A

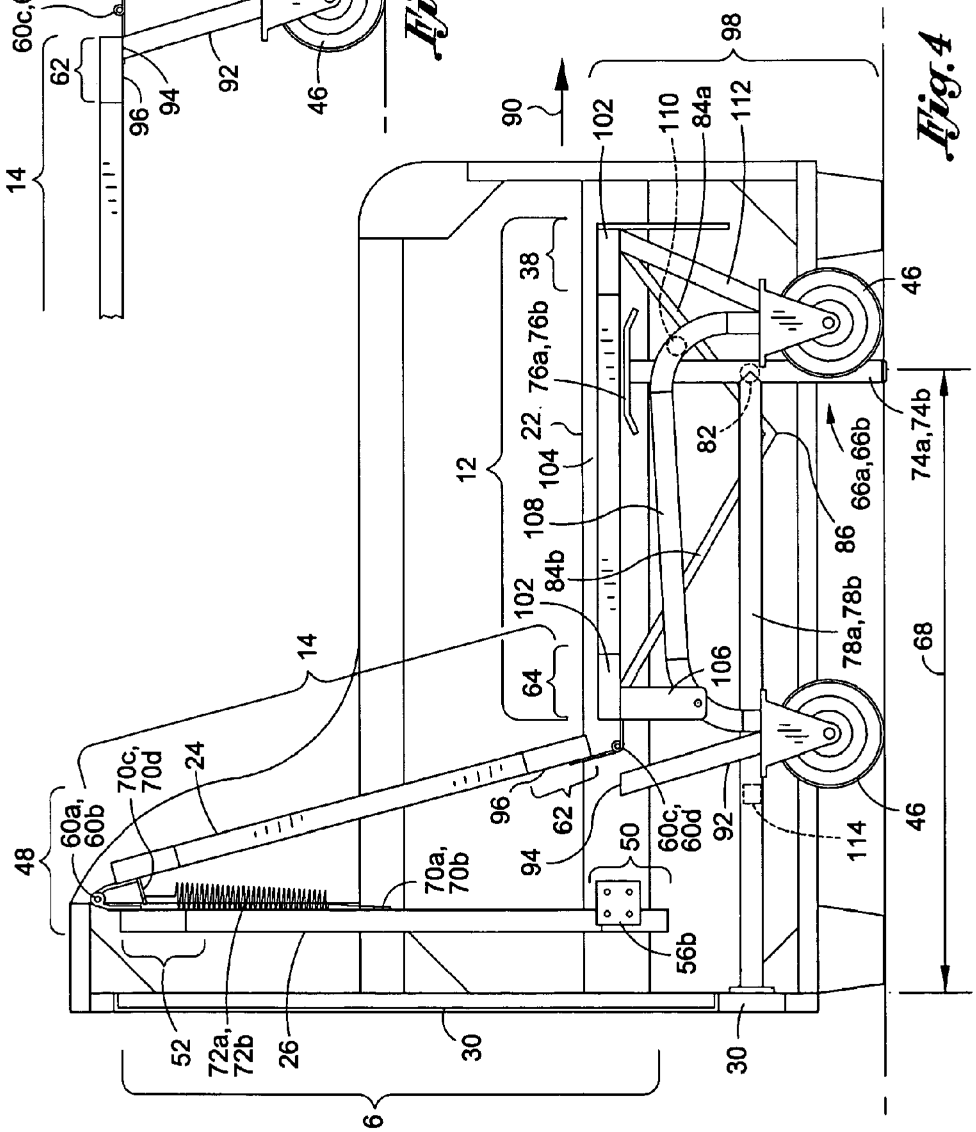
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Fig. 4

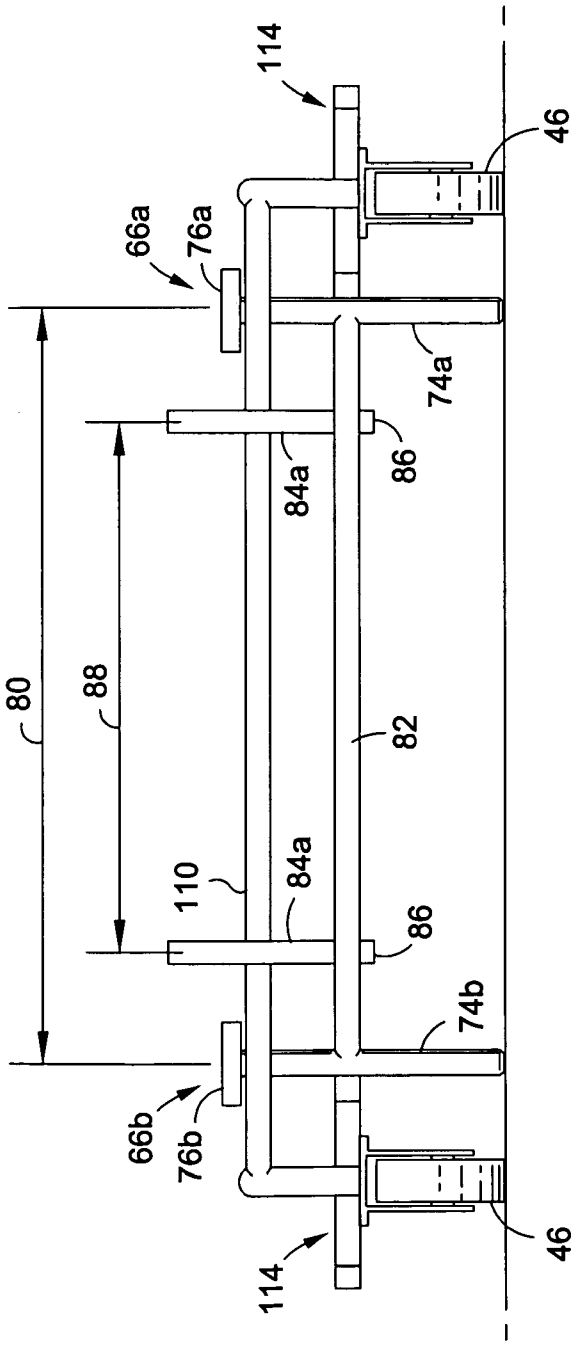

Fig. 5

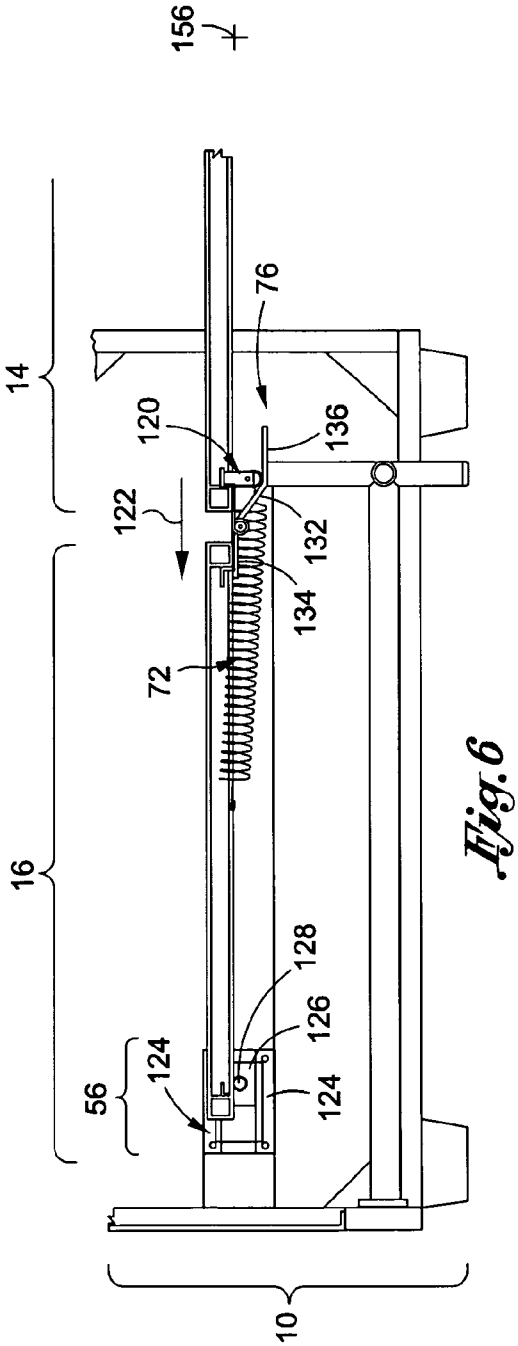
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Fig. 6

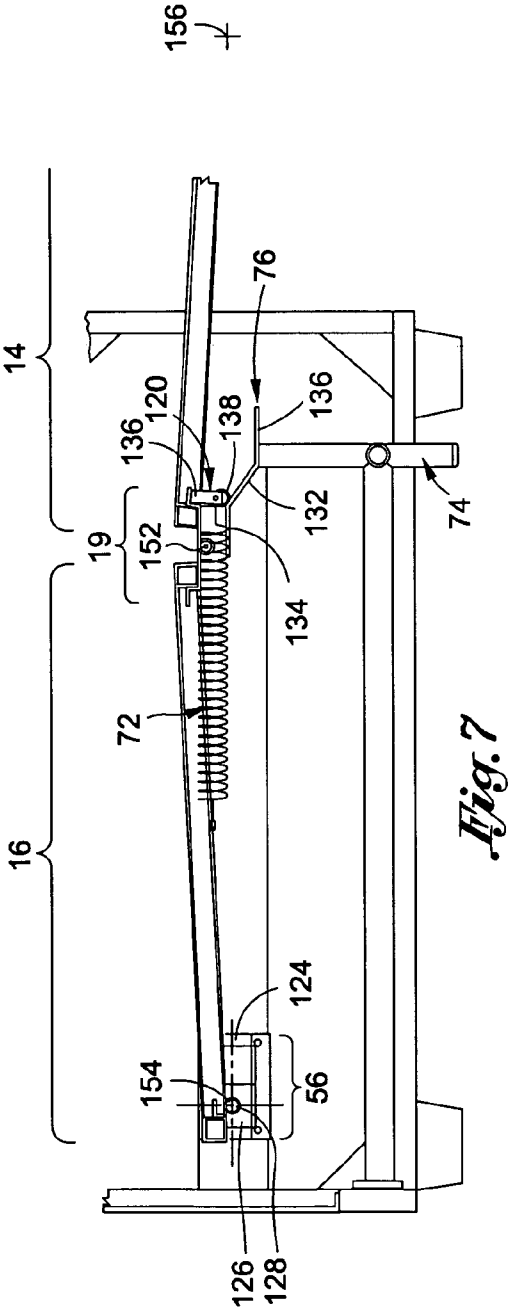
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Fig. 7

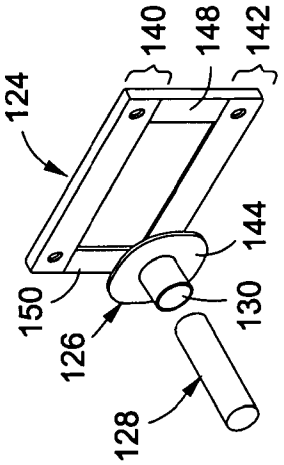
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Fig. 8

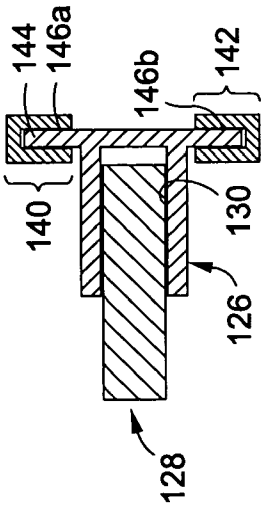
144
146a
146b
142
140
130
126
128

Fig. 9

SLEEPER SOFA

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of U.S. patent application Ser. No. 13/672,516, filed on Nov. 8, 2012, which is a continuation of U.S. patent application Ser. No. 13/436,674, filed on Mar. 30, 2012, now issued as U.S. Pat. No. 8,321,971, which is a continuation of U.S. patent application Ser. No. 13/085,403, filed on Apr. 12, 2011, now issued as U.S. Pat. No. 8,225,439, which is a continuation of U.S. patent application Ser. No. 12/001,810, filed on Dec. 13, 2007, now issued as U.S. Pat. No. 7,945,974, which claims the benefit of U.S. Provisional Applications Ser. Nos. 60/975,759, filed on Sep. 27, 2007 and 61/005,311, filed on Dec. 4, 2007, the entire contents of such provisional applications are incorporated herein by reference.

STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT

Not Applicable

BACKGROUND

The present invention relates to a sofa-bed.

Sofa-beds have been in existence in the United States for many decades. One deficiency in prior art sofa-beds is that they are uncomfortable to sleep in. In particular, the bed frame of the sofa-bed may support a bed cushion via a system of springs. Unfortunately, the springs may not be sufficiently rigid to support a person laying down on the bed. Accordingly, the sleeper may complain of backache or an unpleasant sleep experience.

Another deficiency in prior art sofa-beds is that the bed frame is complex and unstable. In particular, the bed frame is folded into the sofa, and more particularly, into the base portion of the sofa where the person may sit. To fold the entire bed under the base portion of the sofa, the bed frame may have numerous rotating parts to provide a pedestal to support the bed frame above the ground. Moreover, the bed frame may consist of three separate support portions. These support portions and pedestals are folded upon each other in an accordion fashion and tucked into the base portion of the sofa which add to the instability and complexity of prior art sofa-beds. Such prior art devices may be complex to manufacture, heavy and not user friendly. Accordingly there is a need in the art for an improved sofa-bed.

Exampled of prior art sofa-beds are illustrated and described in U.S. Pat. No. 6,904,628 and U.S. Pat. No. 4,737,996.

BRIEF SUMMARY

The sofa-bed discussed herein addresses the deficiencies identified above, identified below and those that are known in the art.

In an aspect of the sofa-bed of the present invention, the same may be easily converted between a sofa and a bed. In particular, a buttock-foot member is slid from a retracted position to an extended position. As the buttock-foot member is traversed to the extended position, a foldable section which is initially at a generally vertical position is then traversed to a generally horizontal position. The foldable section which may comprise a head rest member and a back rest member along with the buttock-foot member forms the bed. To provide a more comfortable sleeping experience, a bed cushion may be disposed upon the head rest member, back rest member and the buttock-foot member.

Conversely, the sofa-bed may be easily converted from the bed configuration to the sofa configuration. In particular, the user may lift a junction between the head rest member and the back rest member upward to traverse the foldable section to the generally vertical position. Simultaneously, the buttock-foot member is traversed toward the retracted position. The user then fully traverses the buttock-foot member to the retracted position.

In an aspect of the sofa-bed, the same may provide a firm back support upon which a guest or user may sleep upon. In particular, the head rest member, the back rest member and the buttock-foot member may have a hard flat member or a plurality of wood slats attached to upper sides thereof. When the foldable section is traversed to the generally horizontal position and the buttock-foot member is traversed to the extended position, the upper sides thereof are substantially coplanar. A bed cushion may be disposed on the hard flat member or wood slats.

To lock the sofa-bed in the sofa configuration, the buttock-foot member may have a locking member attached thereto. The locking member may be disposed behind a transverse bar to prevent forward traversal of the buttock-foot member. Also, a stop member may be disposed behind the buttock-foot member to prevent rearward traversal of the buttock-foot member.

In an aspect of the sofa-bed, the foldable section may be biased toward the generally vertical position when the foldable section is in the generally horizontal position. This aides the user in traversing the sofa-bed from the bed configuration to the sofa configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

FIG. **1** is a perspective view of a convertible sofa-bed in a sofa configuration;

FIG. **2** is a perspective view of a frame of the convertible sofa-bed shown in FIG. **1**;

FIG. **3** is a perspective view of the frame of the convertible sofa-bed shown in FIG. **2** wherein the sofa-bed is in the bed configuration;

FIG. **3**A is perspective view of the convertible sofa-bed shown in FIG. **1** in the bed configuration;

FIG. **4** is a side view of the frame of the convertible sofa-bed shown in FIG. **2**;

FIG. **4**A is an enlarged view of the frame of the convertible sofa-bed shown in FIG. **4**;

FIG. **5** is a partial front view of the frame of the convertible sofa-bed shown in FIG. **2**;

FIG. **6** is a side view of the frame of the convertible sofa-bed with a modified rotating bracket that permits the convertible sofa-bed to be traversed to the folded position from a front of the convertible sofa-bed;

FIG. **7** is a side view of the frame of the convertible sofa-bed shown in FIG. **6** wherein a junction of a foldable section has been pushed upward;

FIG. **8** is a perspective view of a sliding rotating bracket; and

FIG. **9** is a cross-sectional view of a pin, a sliding member and a housing.

DETAILED DESCRIPTION

The present invention relates to a convertible sofa-bed **10** (see FIGS. **1** and **3**A). In a folded position (see FIG. **1**), a person may sit on the sofa-bed. In an unfolded position (see FIG. **3**A), the person may lay flat on the sofa-bed **10**. One benefit of the convertible sofa-bed **10** is that it provides efficient floor use of a person's home or hotel space. When an extra bed is required such as when a guest stays overnight at the person's home, the sofa-bed may be easily unfolded so that the guest may sleep on the sofa-bed in a comfortable manner. During the day, the sofa-bed may be easily folded such that the guest and members of the person's household may use the sofa-bed as a sofa.

The sofa-bed **10** discussed herein provides an easy manner in which the sofa-bed may be converted between the sofa configuration (i.e., folded position) and the bed configuration (i.e., unfolded position). In particular, when the sofa-bed **10** is in the sofa configuration, a buttock-foot member **12** (see FIG. **2**) may be pulled out (see FIG. **3**) to traverse a back rest member **14** and a head rest member **16** which are initially at a generally vertical position (see FIG. **2**) to a generally horizontal position (see FIG. **3**). As shown in FIGS. **3** and **3**A, when the buttock-foot member **12** is pulled out, the head rest member **16**, back rest member **14** and the buttock-foot member **12** may collectively provide a flat support area upon which the user may lay down to sleep. An optional bed cushion **18** (e.g., foam, mattress, air mattress, etc.; see FIG. **3**A) may be disposed on top of the buttock-foot member **12**, back rest member **14** and the head rest member **16** to provide more comfort. The softness or hardness of the bed may be adjusted by providing a soft or a hard bed cushion **18**.

The sofa-bed **10** may be converted back to the sofa configuration by traversing the back rest member **14** and the head rest member **16** to the generally vertical position. To this end, the junction **19** (see FIG. **3**) between the head rest member **16** and the back rest member **14** may be pulled upward (see arrow **21** in FIG. **3**) to fold these two sections **14**, **16** together. The buttock-foot member **12** may be pushed back into a retracted position (see FIG. **2**). Accordingly, the sofa-bed **10** provides an easy method of converting the sofa-bed **10** between a sofa configuration and a bed configuration.

In another aspect of the sofa-bed **10**, a hard flat member (e.g., plywood or particle board) may be attached to each of the upper sides **22**, **24**, **26** (see FIG. **4**) of the buttock-foot member **12**, back rest member **14** and the head rest member **16**. The hard flat member provides a surface upon which the bed cushion **18** may rest upon. Alternatively, a plurality of rigid boards, specifically, wood slats **20** (see FIG. **3** shown in phantom) may be attached to the upper sides **22**, **24**, **26** (see FIG. **4**) of the buttock-foot member **12**, back rest member **14** and the head rest member **16**, as shown in FIG. **3**. The hard flat member and/or wood slats **20** may provide firm support to the person while the person is sleeping and while the person is sitting on the buttock-foot member **12**.

As described below, in another aspect of the sofa-bed **10**, the same **10** may be locked into the sofa configuration such that the buttock-foot member **12** does not slide out inadvertently and traverse the sofa-bed **10** to the bed configuration. Conversely, the same may be locked into the bed configuration such that the sofa bed **10** is not inadvertently converted to the sofa configuration from the bed configuration.

The sofa-bed **10** may comprise a frame **28** (see FIG. **3**). The frame **28** may comprise a rear base board **30** (see FIG. **3**), left and right arm rests **32***a, b* (see FIGS. **1** and **3**) and a hood member **34** (see FIG. **3**). The rear base board **30** may generally define the rear of the sofa-bed **10**. The left and right arm rests **32***a, b* may be attached to opposed lateral ends of the rear base board **30** and the hood member **34** and extend forwardly therefrom. As shown in FIG. **2**, the rear base board **30** and the hood member **34** and the left and right arm rests **32***a, b* may circumscribe the buttock-foot member **12**, back rest member **14** and the head rest member **16** when they **12**, **14**, **16** are in the folded position. The rear base board **30** and the left and right arm rests **32***a, b* may hide the various mechanisms which are unaesthetically pleasing. The hood member **34** may extend over the junction **19** (see FIG. **2**) between the head rest member **16** and the back rest member **14** when the sofa-bed **10** is in the folded position to cover the junction **19**.

The front of the sofa-bed may have a foot board **36** (see FIG. **1**) attached to a proximal end portion **38** (see FIG. **3**) of the buttock-foot member **12**. The foot board **36** may be generally vertically oriented and may extend adjacent the upper side **22** (see FIGS. **3** and **4**) of the buttock-foot member **12** to lower edges **40***a, b* (see FIG. **1**) of the left and right arm rests **32***a, b*. As shown in FIG. **1**, when the sofa-bed **10** is in the folded position, the foot board **36** may be aligned to the left and right arm rests **32***a, b* to hide the various mechanisms of the sofa-bed **10**.

The frame **28**, or more particularly, the rear base board **30**, left and right arms rests **32***a, b*, hood member **34** and the foot board **36** may be covered with a cloth, as shown in FIG. **1**. The cloth may have a aesthetically pleasing color and/or pattern. A soft plush cushioning material may be disposed between the cloth exterior and the frame **28**. The cushioning material may provide a soft plush feel to the sofa-bed **10**.

In the folded position, as shown in FIG. **4**, the back rest member **14** may be slightly reclined. Also, the buttock-foot member **12** may be generally horizontal. The back rest member **14** and the buttock-foot member **12** may collectively provide a sitting area upon which a person may rest his/her buttocks on the buttock-foot member **12** and lean backwards to rest his/her back upon the back rest member **14**. To provide a more comfortable seating arrangement, one or more seat cushions **42** (see FIG. **1**) may be placed on top of the buttock-foot member **12**. The seat cushion **42** may be fabricated from any material used as a cushion or fabricated in any cushion configuration currently used or those that are developed in the future. Additionally, one or more back rest cushions **44** (see FIG. **1**) may be laid against the back rest member **14** to provide a comfortable interface between the back rest member **14** and the user's back. Similar to the seat cushion **42**, the back rest cushions **44** may be fabricated from any material and fabricated in any configuration that is currently used for back cushions known in the art or developed in the future.

To convert the sofa-bed **10** from a sofa to a bed, the user may unlock the sofa-bed **10** such that the user may pull the buttock-foot member **12** in a forward direction as indicated by arrow **90** in FIGS. **2** and **4**. The buttock-foot member **12** may be supported by a plurality of wheels **46**. The wheels **46** may be fixed (i.e., not swivelable) and oriented in the forward direction to aid in the easy conversion of the sofa-bed **10** from a sofa to a bed and vice versa. The wheels **46** may also be light weight. The buttock-foot member **12** may have four wheels **46**. One wheel **46** may be located closely adjacent to each corner of the buttock-foot member **12**. The left and right wheels **46** may be spread apart to

provide stability to the buttock-foot member **12**. Likewise, the front and rear wheels **46** may be spread apart to provide stability to the buttock-foot member **12**. The wheels **46** permit the user to easily roll out the buttock-foot member **12** from the retracted position (see FIG. **2**) to an extended position (see FIG. **3**). Even if the buttock-foot member **12** is heavy, the wheels **46** support the weight such that the user may easily roll the buttock-foot member **12** between the retracted and extended positions.

The head rest member **16** and the back rest member **14** may collectively define a foldable section **48** (see FIGS. **3** and **4**). When the sofa/bed **10** is in the folded position, the foldable section **48**, and more particularly, the back rest member **14** and the head rest member **16** are in a generally vertical position as shown in FIG. **4**. The head rest member **16** may be oriented generally vertical behind and covered by the back rest member **14**. The back rest member **14** may be slightly reclined to provide a comfortable surface upon which the user may lean backwards and rest upon.

As discussed above, from the folded position, the buttock-foot member **12** may be traversed forward. As the buttock-foot member **12** is traversed forward, the foldable section **48** is brought to a generally horizontal position, as shown in FIG. **3**. More particularly, the head rest member **16** may define a distal end portion **50** (see FIG. **4**) and a proximal end portion **52** (see FIG. **4**). The distal end portion **50** (see FIG. **4**) of the head rest member **16** may be pivotably connected to the left and right arm rests **32***a, b*, as shown in FIG. **3**. By way of example and not limitation, the distal end portion **50** of the head rest member **16** may be pivotably connected to the left and right arm rests **32***a, b* via rotating brackets **56***a, b* (see FIG. **3**). The proximal end portion **52** of the head rest member **16** may be pivotably connected to a distal end portion **58** of the back rest member **14** such as via hinges **60***a, b* (see FIGS. **3** and **4**). Similarly, a proximal end portion **62** of the back rest member **14** may be pivotably connected to a distal end portion **64** of the buttock-foot member **12** such as with hinges **60***c, d* (see FIGS. **3** and **4**).

As the buttock-foot member **12** is pulled forward to the extended position, the foldable section **48** traverses to a generally horizontal position. The head rest member **16** pivots about the rotating brackets **56***a, b*. Simultaneously, the back rest member **14** rotates about the hinges **60***a, b* and the hinges **60***c, d*. The back rest member **14** and the head rest member **16** continues to rotate until they **14**, **16** are in the generally horizontal position. At the generally horizontal position, the proximal end portion **52** of the head rest member **16** and/or the distal end portion **58** of the back rest member **14** may rest upon support members **66***a, b* (see FIGS. **3** and **4**). The support members **66***a, b* may be positioned and sized and configured from the rear base board **30** a distance **68** (see FIG. **4**) such that the proximal end portion **52** of the head rest member **16** and/or the distal end portion **58** of the back rest member **14** rests upon the support members **66***a, b* when the foldable section **48** is in the generally horizontal position, as shown in FIG. **3**. Preferably, at the generally horizontal position, the upper sides **22**, **24** and **26** of the buttock-foot member, back rest member **14** and the head rest member **16** are substantially coplanar and level with the floor, as shown in FIG. **3**. The optional bed cushion **18** (see FIG. **3**A) may then be placed on top of the buttock-foot member **12**, back rest member **14** and the head rest member **16**.

The support member **66***a, b* may comprise two pedestals **74***a, b* (see FIGS. **3** and **4**). The pedestals **74***a, b* may each have a flat upper bar **76***a, b* upon which the proximal end portion **52** of the head rest member **16** and/or the distal end portion **58** of the back rest member **14** rest upon, as shown in FIG. **3**. To maintain the position of the pedestal **74***a, b*, longitudinal member **78***a, b* (see FIGS. **2**, **3** and **4**) may be attached to the rear base board **30** and extend forward to the pedestal **74***a, b*. The longitudinal member **78***a, b* may each be attached to the rear base board **30** with a bracket and screws. The proximal end of the longitudinal members **78***a, b* may be attached (e.g., welded) to the pedestals **74***a, b*. Likewise, the upper bars **76***a, b* may be welded to the pedestals **74***a, b*. The left and right wheels **46** disposed on the under side of the buttock-foot member **12** may be spaced apart so as to be wider than a width **80** (see FIGS. **2** and **5**) of the support members **66***a, b*. The buttock-foot member **12** may be freely traversed between the retracted position and the extended position without interference between the wheels **46** and the support members **66***a, b*.

To assist the user in traversing the sofa-bed **10** back to the sofa configuration from the bed configuration, the foldable section **48** may be biased toward the generally vertical position when the sofa-bed **10** is in the bed configuration. By way of example and not limitation, two extensions **70***a, b* (see FIGS. **2**, **3** and **4**) may be attached to the head rest member **16**. They **70***a, b* extend inward, as shown in FIGS. **2** and **3**. Two more extensions **70***c, d* (see FIGS. **3** and **4**) may be attached to the back rest member **14**. They **70***c, d* may extend downward as shown in FIG. **3**. A first spring **72***a* may be attached to the extensions **70***a, c*. A second spring **72***b* may be attached to the extensions **70***b, d*.

In the bed configuration (see FIG. **3**), the springs **72***a, b* initially bias the foldable section **48** toward the generally vertical position. This aides the user in converting the sofa-bed **10** from a sofa to a bed. To convert the sofa-bed **10** from the bed to the sofa, the user may stand on a side of the sofa-bed **10**. The weight of the buttock-foot member **12** and the back rest member **14** is greater than the spring force of the springs **72***a, b*. Accordingly, the foldable section **48** remains in the generally horizontal position at the bed configuration. The user then lifts the junction **19** of the back rest member **14** and head rest member **16** upward (see arrow **21** in FIG. **3**) until the spring force overcomes the weight of the head rest member **16** and the back rest member **14**. The springs **72***a, b* partially traverse the head rest member **16** and the back rest member **14** toward the generally vertical position. The head rest member **16** and the back rest member **14** may remain buckled even if the user stops lifting the junction **19** of the back rest member **14** and head rest member **16** upward. The user may then step towards the front of the buttock-foot member **12** and push the buttock-foot member **12** to the retracted position to complete the conversion of the sofa-bed **10** from the bed configuration to the sofa configuration.

To lock the sofa-bed **10** in the bed configuration or the buttock-foot member **12** in the retracted position, as shown in FIGS. **3** and **4**, a transverse member **82** attached between pedestals **74***a, b* may catch a first locking member **84***a* when the buttock-foot member **12** is in the retracted position. More particularly, as shown in FIG. **4**, in the retracted position, the first locking member **84***a* is disposed behind the transverse member **82**. A lower distal end **86** (see FIGS. **4** and **5**) of the first locking member **84***a* may be elevationally lower than the transverse member **82**. In the event that the buttock-foot member **12** is urged forward, the first locking member **84***a* contacts the transverse member **82** to prevent the inadvertent traversal of the buttock-foot member **12** to the extended position.

To aid the user in disposing the locking member **84***a* behind the transverse member **82**, a second member **84***b* (see

FIG. **4**) may be attached to the first locking member **84***a* . The second member **84***b* may be an elongate bar angled backward. When the first locking member **84***a* is in front of the transverse member **82**, the second member **84***b* is also disposed in front of the transverse member **82**. As the buttock-foot member **12** is being traversed to the retracted position, the second member **84***b* initially contacts the transverse bar **82**. The user may lift and push the buttock-foot member **12** toward the retracted position such that the second member **84***b* slides against the transverse member **82**. As the user continues to lift and push the buttock-foot member **12**, the lower distal end **86** of the first locking member **84***a* traverses past the transverse member **82** and may drop behind the transverse member **82**, as shown in FIG. **4**.

Conversely, to traverse the buttock-foot member **12** to the extended position from the retracted position, the user may lift the locking member **84***a* up and over the transverse member **82**. At which point, the buttock-foot member **12** may be traversed to the extended position. More particularly, the locking member **84***a* may be angled forward. This assists the user in sliding the first locking member **84***a* up and over the transverse member **82**. From the retracted position, the user may pull and lift the buttock foot member **12** toward the extended position. The first locking member **84***a* may contact and slide against the transverse member **82**. The user may continue to pull and lift the buttock-foot member **12** toward the extended position until the lower distal end **86** of the first locking member **84***a* traverses past the transverse member **82**. The user may lower the buttock-foot member **12** such that the wheels **46** contacts the floor. The user may continue to pull the buttock-foot member **12** to the fully extended position.

The distance **88** (see FIGS. **2** and **5**) between the first locking numbers **84***a* may be smaller than the width **80** of the support members **66***a, b*. When the buttock-foot member **12** is traversed to the retracted position, the wheels **46** roll past the outside of the support members **66***a, b* and the first and second members **84***a, b* are slid between the support members **66***a, b*.

Referring now to FIGS. **3**, **4** and **4**A, a support post **92** may be attached to a base of the rear wheels **46**. The support post **92** may extend from the base of the wheels to an underside of the backrest member **14**. More particularly, the distal end **94** (see FIGS. **4** and **4**A) may contact a bottom surface **96** (see FIG. **4**) of the proximal end portion **62** of the backrest member **14**, when the sofa-bed **10** is in the bed configuration, as shown in FIGS. **3** and **4**A. When the sofa-bed **10** is in the bed configuration, the rear wheels **46** support both the backrest member **14** and the buttock-foot member **12**. The rear wheels **46** are preferably vertically aligned below the proximal end portion **62** of the backrest member **14** and the distal end portion **64** of the buttock-foot member **12**. Accordingly, when a force is directed downward onto these two portions **62**, **64**, the forces are directed to the rear wheel **46** through both the support post **92** and the frame **98** of the buttock-foot member **12** to provide stability.

A handle **100** (see FIG. **3**A) may be attached to a front portion of the buttock-foot member **12**. The handle **100** may be utilized to pull the buttock-foot member **12** to the extended position from the retracted position. Moreover, the handle **100** may be utilized to lift the first and second members **84***a, b* up and over the transverse member **82** to lock or unlock the sofa-bed **10** in the sofa configuration. The handle **100** may be fabricated from a fabric material. Also, the handle **100** may be tucked under the seat cushions **42** when the sofa-bed **10** is in the bed configuration.

In an aspect of the sofa-bed **10**, in an alternative embodiment of the bed-cushion **18**, three separate cushions maybe attached to the upper sides **22**, **24**, **26** of the buttock-foot member, backrest member **14**, and the headrest member **16**, as shown in FIG. **3**A. These separate cushions may extend to the lateral and longitudinal edges of the respective members **16**, **14**, **12**. These cushions may each be fabricated from a soft plush material to provide a comfortable sleeping interface for the person. Moreover, these cushions may be permanently attached removeably upholstered (e.g., stapled, stitched, etc.) to the respective members **16**, **14**, **12**. In the event that the cushions are removeably upholstered to the members **16**, **14**, **12**, the end user may replace one or all three of the members **16**, **14**, **12** after the cushion(s) has been damaged or worn down. It is contemplated that the optional bed cushion **18** shown in FIG. **3**A may be laid on top of these three separate cushions, or the three separate cushions may themselves constitute the bed cushion **18**.

Referring now to FIGS. **3** and **4**, the frame **98** (see FIG. **4**) of the buttock-foot member **12** may comprise longitudinal and lateral members **102**, **104**. Extensions **106** (see FIG. **4**) may be attached to the distal end portion **64** of the buttock-foot member **12**. The extensions **106** may extend downward. These extensions **106** may also be attached to U brackets **108**. The U brackets **108** may have an inverted U-orientation. Opposed distal ends of the U brackets **108** may be attached to the base of the front and rear wheels **46**. The U brackets **108** fix the distance between the front and rear wheels **46**. A transverse member **110** (FIG. **3**) may be attached to the U brackets **108** to fix the distance between the left and right wheels **46**. To stabilize the U brackets **108** and the wheels **46** to the longitudinal and lateral member **102**, **104**, extension **112** (see FIGS. **3** and **4**) may be attached to the base of the front wheels **46** and a proximal end portion **38** (see FIG. **4**) of the buttock-foot member **12**. As can be seen from FIG. **4**, the transverse member **110** is disposed in front of the pedestal **74***a, b* of the support members **66***a, b* when the buttock-foot member **12** is in the retracted position (see FIG. **4**). Accordingly, the transverse member **110** does not interfere with the traversal of the buttock-foot member **12** between the retracted position and the extended position.

In an aspect of the sofa-frame **10**, each of the buttock-foot member **12**, backrest member **14** and the headrest member **16** may have a rectangular configuration. The corners of each of the members **12**, **14**, **16** may be rounded to prevent the corners from hurting an individual.

The buttock-foot member **12** may be locked into position when the buttock-foot member **12** is in the retracted position. As discussed above, the first locking member **84***a* contacts the transverse member **82** to prevent the buttock-foot member **12** from sliding forward to the extended position. To prevent the buttock-foot member **12** from sliding rearward toward the rear base board **30**, stop members **114** (see FIGS. **2**, **3** and **4**) may be disposed behind the rear wheels **46**. The stop member **114** may be attached to the left and right armrest **32***a, b* such as with screws. Also, the stop members **114** may be attached (e.g., screwed, welded, etc.) to the longitudinal members **78***a, b*. In the retracted position, the stop member **114** may contact the frame **98** of the buttock-foot member **12** including but not limited to the support post **92** to limit the rearward movement of the buttock-foot member **12**. Accordingly, the buttock-foot member **12** is cradled between the stop members **114** and the transverse bar **82**. More particularly, each of the stop members **114** may have a U-shaped configuration. The tines **116** of the stop members **114** may be attached to the longitudinal members **78***a, b* and the left and right armrest **32***a, b*. A base

118 of the stop members 114 may be attached to the tines 116 and be disposed behind the rear wheels 46. When the buttock-foot member 12 is urged rearward, the frame 98 of the buttock-foot member 12 or the support post 92 contacts the base 118 of the stop member 114 to prevent rearward motion of the buttock-foot member 12.

The sofa-bed 10 may also be lifted while in the sofa configuration. By way example not limitation, two people may lift the left and right armrest portions 32*a, b*. Gravity will tend to draw the headrest member 16, backrest member 14 and the buttock-foot member 12 downward. The buttock-foot member 12 is cradled between the transverse member 82 and the stop member 114. As the movers lift the sofa-bed 10, the first locking member 84*a* contact the transverse member 82, as shown in FIG. 4. Also, the support post 92 which are angled rearwardly contacts the base 118 of the stop members 114.

Referring now to FIGS. 6-9, generally, the rotating bracket 56, upper bar 76 have been modified. Also, a roller 120 has been added to the sofa-bed 10. These changes permit the sofa-bed 10 to be traversed to the folded position while the user remains in front of the buttock-foot member 12. The user does not have to move to the side of the sofa-bed to the lift the junction 19 (see FIG. 7) to start the process of traversing the sofa-bed 10 to the folded position. FIG. 6 illustrates the sofa-bed 10 while in the unfolded position. To traverse the sofa-bed 10 to the folded position, the user may push the buttock-foot member 12 (not shown in FIG. 6) in the direction of arrow 122 (see FIG. 6). Upon pushing the buttock-foot member 12 in the direction of arrow 122, the buttock-foot member 12, backrest member 14 and the headrest member 16 are slid toward the rear of the sofa-bed 10, as shown in FIG. 7. To this end, the rotating bracket 56 may comprise a housing 124, a sliding member 126 and a pin 128, as shown in FIG. 8. The pin may be fixedly attached (e.g., welded, etc.) to the headrest member 16. An opposed distal end portion of the pin 128 may be inserted into a receiving hole 130 of the sliding member 126, as shown in FIG. 9. The pin 128 may rotate within the receiving hole 130. The sliding member 126 may be traversed between a retracted position (see FIG. 7) and an extended position (see FIG. 6) within the housing. The housing 124 may be fixedly attached (e.g., screw, etc.) to the armrest 32. When the buttock-foot member 12 is pushed in the direction of arrow 122, the sliding member 126 moves backward to the retracted position (see FIG. 7).

As the sliding member 126 is traversed to the retracted position, the buttock-foot member 12, backrest member 14 and the headrest member 16 also move to the rear of the sofa-bed 10. The roller 120 attached adjacent the junction 19 is pushed upward by ramp portion 132 of the upper bar 76 to push the junction 19 upward. The upper bar 76 may have a Z shaped configuration and define the ramp portion 132 which is at an angle with respect to the general horizontal direction of arrow 122. A flat support surface 134 may be attached to a distal end of the ramp portion 132. The flat support surface 134 may be operative to support the junction 19 when the sofa-bed is in the unfolded position, as shown in FIG. 6. Moreover, in the unfolded position, the roller 120 may extend downward and optionally rest upon a flat support surface 136 of the upper bar. As can be seen by comparison of FIGS. 6 and 7, pushing the buttock-foot member 12 in the direction of arrow 122 raises the junction 19 (see FIG. 7). This simulates the lifting of junction 19 by hand as previously discussed in order to start the process of converting the sofa-bed 10 from the unfolded position to the folded position. In the sofa-bed 10 shown in FIGS. 6 and 7, the user need only push the buttock-foot member 12 in the direction of arrow 122 while remaining in front of the sofa-bed. The junction 19 is raised upward as the roller 120 rolls up on the ramp 132. The spring 72 may be sufficiently strong such that the weight of the backrest member 14 and the headrest member 16 is supported by the spring 72 when the roller 120 reaches the upper portion of the ramp portion 132 (see FIG. 7). Alternatively, the user may continue to push the buttock-foot member 12 in the direction of arrow 122 thereby further buckling the backrest member 14 and the headrest member 16 to the generally upright position until the spring 72 supports the weight of the backrest member 14 and headrest member 16. The spring 72 assists the user in traversing the sofa-bed 10 from the unfolded position to the folded position, as discussed above. The user may complete folding the sofa-bed by pushing the buttock-foot member 12 until the locking member 84 is behind or caught by the transverse bar 82.

The roller 120 may be comprised of an extension 136 (see FIG. 7) and a wheel 138 (see FIG. 7). The extension 136 may be attached to the backrest member 14 and positioned such that the wheel 138 contacts the ramp portion 132 when the sliding member 126 is in the retracted position (see FIG. 7). In this manner, the weight of the backrest member 14 and headrest member 16 may push the roller 120 down the ramp portion 132 and traverse the sliding member 126 to the extended position (see FIG. 6). When the sliding member 126 is at the extended position and the sofa-bed 10 is in the unfolded position, the roller 138 may optionally contact and be supported by the flat support surface 136.

As discussed above, the sliding member 126 may be traversed between a retracted position (see FIG. 7) and an extended position (see FIG. 6). To this end, the housing 124 may have an upper channel member 140 and a lower channel member 142, as shown in FIGS. 8 and 9. The sliding member 126 may have a flange 144. The upper and lower channel members 140, 142 may have opposed grooves 146*a, b*. The opposed grooves 140*a, b* may be sized and configured along with the flange 144 such that the flange 144 may be received into the opposed grooves 146*a, b*. The opposed grooves 146*a, b* may extend a substantial length along the longitudinal length of the upper and lower channel members 140, 142. In this manner, the sliding member 126 may slide between the retracted position and the extended position within the opposed grooves 146*a,b*.

To limit the forward and rearward travel of the sliding member 126 within the housing 124, front and rear backstops 148, 150 (see FIG. 8) may be attached to the opposed distal end portions of the upper and lower channel members 140, 142. Accordingly, as the sliding member 126 is traversed toward the extended position, the flange 144 contacts the front backstop 148 to limit forward movement of the sliding member 126. Conversely, as the sliding member 126 is traversed toward the retracted position, the flange 144 contacts the rear backstop 150 to limit rearward travel of the sliding member 126. The sliding member 126 may slide forward and rearward to permit the roller 120 to be pushed upward on the ramp 132 to buckle the headrest member 16 and the backrest member 14 and begin the process of folding the sofa-bed 10. Also, the sliding member 126 may slide within the housing 124 a sufficient distance to allow the roller to slide downward on the ramp 132 and allow the headrest member 16 and the backrest member 14 to reach a generally horizontal orientation.

To assist in the sliding of the sliding member 126 within the housing 124, a lubricant (e.g., grease) may be applied in the opposed grooves 146*a, b*. Moreover, lubricant (e.g.,

grease) may be applied within the receiving hole **130** to promote rotation of the pin **128** within the receiving hole **130**.

In an aspect of the sofa-bed **10**, other means of buckling the headrest member **16** and the backrest member **14** are also contemplated. Generally, the pivot axis **152** (defined by the rotation of headrest member **16** and the back rest member **14**) should be misaligned or offset from the pivot axis **154** (defined by the pin **128**) and pivot axis **156** (defined by the backrest member **14** and the buttock-foot member **12**) to start the process of folding the sofa-bed **10** from the unfolded position to the folded position. By way of example and not limitation, it is contemplated that the pivot axis **154** may be lowered while maintaining the elevation of the pivot axis **152** when the buttock-foot portion **12** is pushed toward the rearward direction. This may also act to buckle the headrest member **16** and the backrest member **14** to start the process of traversing the sofa-bed **10** to the folded position from the unfolded position.

The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within the scope and spirit of the invention disclosed herein. Further, the various features of the embodiments disclosed herein can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described herein. Thus, the scope of the claims is not to be limited by the illustrated embodiments.

What is claimed is:

1. A convertible sofa comprising:

a base frame assembly comprising at least one lateral side member wherein at least a portion of the lateral side member is positioned in general horizontal relation above a supporting floor surface, and at least one cross member positioned generally orthogonally to said side member and wherein at least a portion of said cross member is positioned in general horizontal relation above a supporting floor surface;

an articulating assembly comprising:

a quadrilateral headrest member having opposed lateral side members and opposed longitudinal side members;

a quadrilateral backrest member having opposed lateral side members, and opposed longitudinal side members;

a quadrilateral foot member having opposed lateral side members, opposed longitudinal side members, and at least one catch member; and

a hinge coupled to one of the longitudinal side members of the backrest member and spaced from the lateral side members of the backrest member;

the headrest, backrest, and foot members being connected to each other such that the articulating assembly is selectively movable between a first position wherein the headrest, backrest, and foot members extend in generally co-planar relation to each other, and a second position wherein the headrest and backrest members each extend at a particular angular relation to the foot member, the at least one catch member configured to releasable engage said at least one cross member to maintain the articulating assembly in said second position and disengage said at least one cross member to allow said articulating assembly to be moved to said first position;

the articulating assembly and the base frame assembly being oriented relative to each other such that the movement of the articulating assembly to the first position facilitates the engagement of the base frame assembly to at least one of the headrest and backrest members to provide support of the articulating assembly in the first position; and

a biasing member connected to one of the headrest member and the backrest member and adapted to bias the articulating assembly to the second position.

2. The convertible sofa of claim **1**, wherein said headrest and backrest members are pivotally connected to each other.

3. The convertible furniture of claim **1**, wherein said backrest and foot members are pivotally connected to each other.

4. The convertible furniture of claim **1**, wherein in said second position, the headrest member extends in an angular relation to the backrest member.

5. The convertible furniture of claim **1**, further comprising wheels attached to the footrest member.

6. The convertible furniture of claim **1**, wherein the headrest, backrest, and foot members are generally the same size.

7. A convertible sofa comprising:

an articulating assembly comprising:

a quadrilateral headrest member;

a quadrilateral backrest member pivotally coupled to the headrest member and having opposed lateral side members and opposed longitudinal side members;

a quadrilateral foot member pivotally coupled to the backrest member; and

a hinge coupled to one of the longitudinal side members of the backrest member and spaced from the lateral side members of the backrest member;

the articulating assembly being transitional between a stowed position and a deployed position, the headrest member and backrest member transitioning from a generally co-planar configuration in the deployed position to a generally angled configuration in the stowed position;

a biasing member connected to the articulating assembly and adapted to bias the articulating assembly toward the stowed position;

a support member having at least one lateral side member and at least one cross member positioned generally orthogonally to said lateral side member and wherein said support member is engageable with an underlying floor surface and adapted to support the articulating assembly when the articulating assembly is in the deployed position; and

a catch adapted to releasably engage the cross member when the articulating assembly is in the stowed position to hold the articulating assembly in the stowed position, and to disengage the cross member when the articulating assembly is in the deployed position.

8. The convertible sofa of claim **7**, wherein the support member is in direct contact with the headrest member when the articulating assembly is in the deployed position.

9. The convertible sofa of claim **7**, wherein the support member is in direct contact with the backrest member when the articulating assembly is in the deployed position.

10. The convertible sofa of claim **7**, wherein the support member is in direct contact with the headrest member and the backrest member when the articulating assembly is in the deployed position.

11. The convertible sofa of claim **7**, further comprising a wheel connected to the articulating assembly.

12. The convertible furniture of claim **7**, wherein the headrest, backrest, and foot members are generally the same size.

13. The convertible sofa of claim 7, wherein the headrest member, backrest member and foot member are generally the same shape.

14. Convertible furniture comprising:

a base frame comprising;

at least one frame member positioned in general horizontal relation to supporting floor surface and including a cross-bar positioned in general horizontal relation to the floor surface;

at least one support member interconnected to said at least one frame member; and

an articulating assembly comprising:

a quadrilateral headrest member having opposed lateral side members and opposed longitudinal side members;

a quadrilateral backrest member having opposed lateral side members, opposed longitudinal side members, a first end portion, and an opposing second end portion, the first end portion being coupled to the headrest member; and

a quadrilateral foot member further having opposed lateral side members, opposed longitudinal side members, a first end portion and an opposing second end portion, the first end portion being coupled to the second end portion of the backrest member;

the headrest, backrest and foot members being connected to each other such that the articulating assembly is selectively movable between a first position wherein the headrest, backrest, and foot members extend in generally co-planer relation to each other, and a second position wherein the headrest and backrest member each extend at a particular angular relation to the foot member; the articulating assembly and the base frame being oriented relative to each other such that the movement of the articulating assembly to the first position results in the at least one support member supporting the articulating assembly;

a support post coupled to one of the second end portion of the backrest member and the first end portion of the foot member and adapted to support the corresponding one of the second end portion of the backrest member and the first end portion of the foot member over the floor surface; and

a biasing member coupled to the base frame and the articulating assembly and adapted to bias the articulating assembly to the second position.

15. The convertible furniture of claim 14 wherein said foot member further comprises at least one catch member to releasably engage the cross-bar to maintain the articulating assembly in said second position and to disengage the cross-bar to allow said articulating assembly to be moved to said first position.

16. The convertible sofa of claim 14, further comprising a wheel connected to the articulating assembly.

17. The convertible furniture of claim 14, wherein the headrest, backrest, and foot members are generally the same size.

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