United States Patent

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[54] HINGED-SEAT PLATFORM FOR SOFA-BED

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[52] **U.S. Cl.** ..... **5/13,** 5/53 B

[51] **Int. Cl.** **A47c 17/14,** A47c 17/22

[58] **Field of Search** 5/13, 14, 18, 28, 31–51, 5/53

[56] **References Cited**

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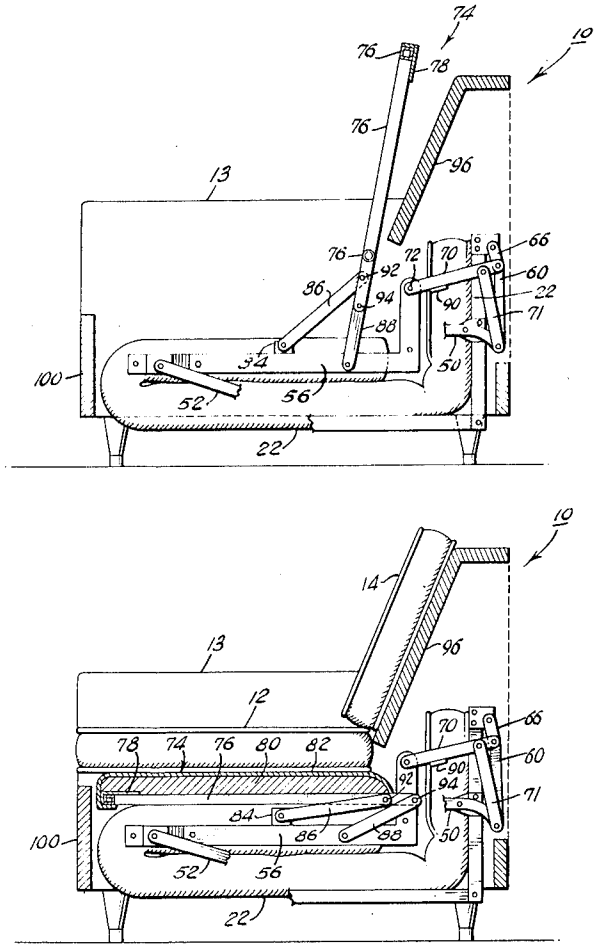
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[57] **ABSTRACT**

The sofa-bed has a hinged, cushioned seat platform which provides a soft support for the seat cushions when the sofa-bed is used as a sofa, and which swings to an upright position to form a headboard for the bed when it is unfolded. The hinge structure permits the pivot point of the platform to rise and fall when people get up from or sit down on the sofa cushions.

11 Claims, 5 Drawing Figures



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SHEET 1 OF 3

Fig. 1.

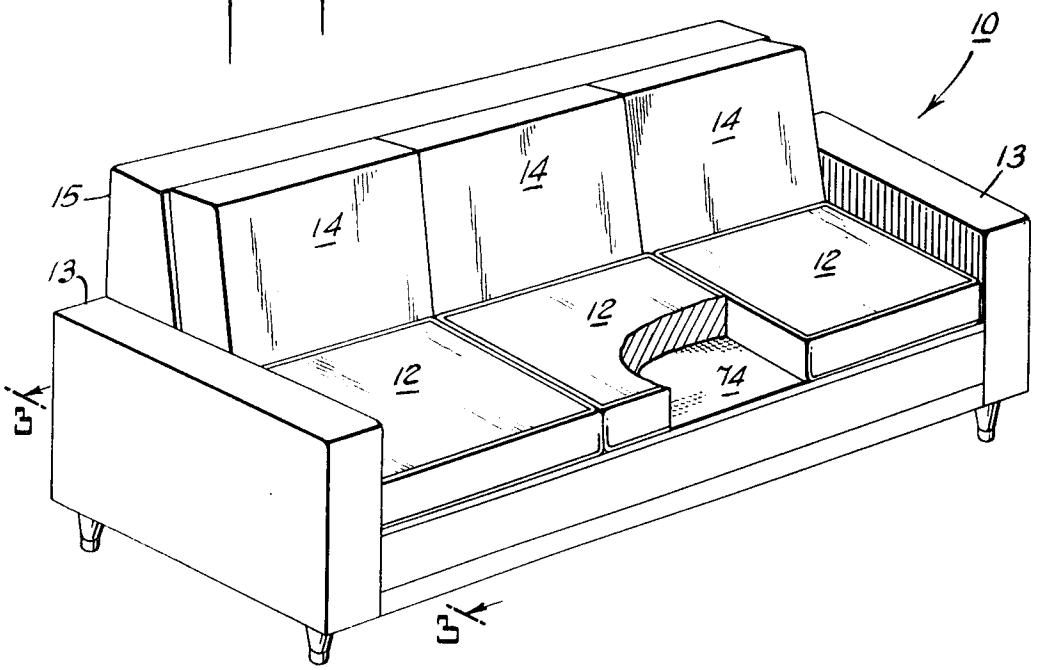
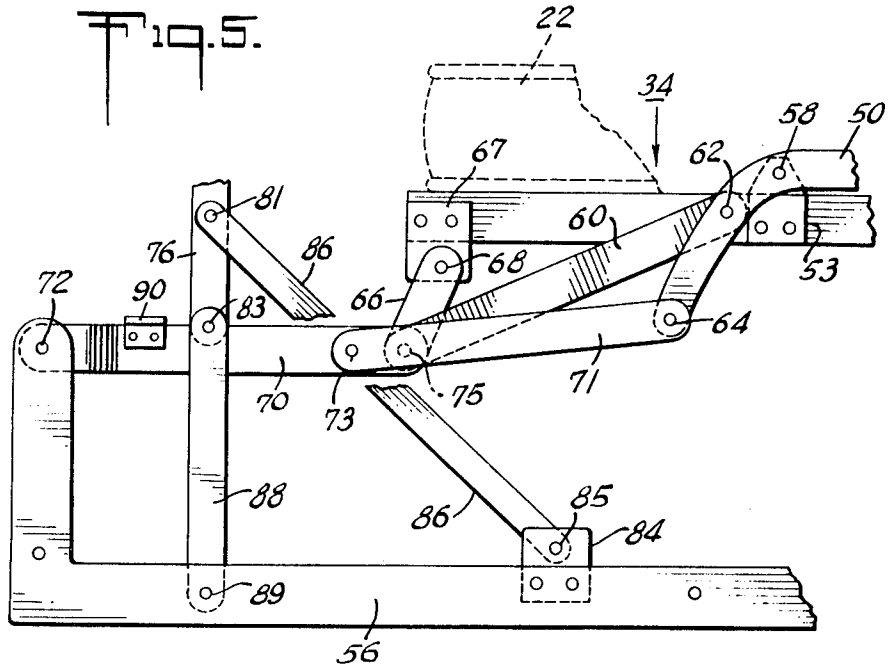
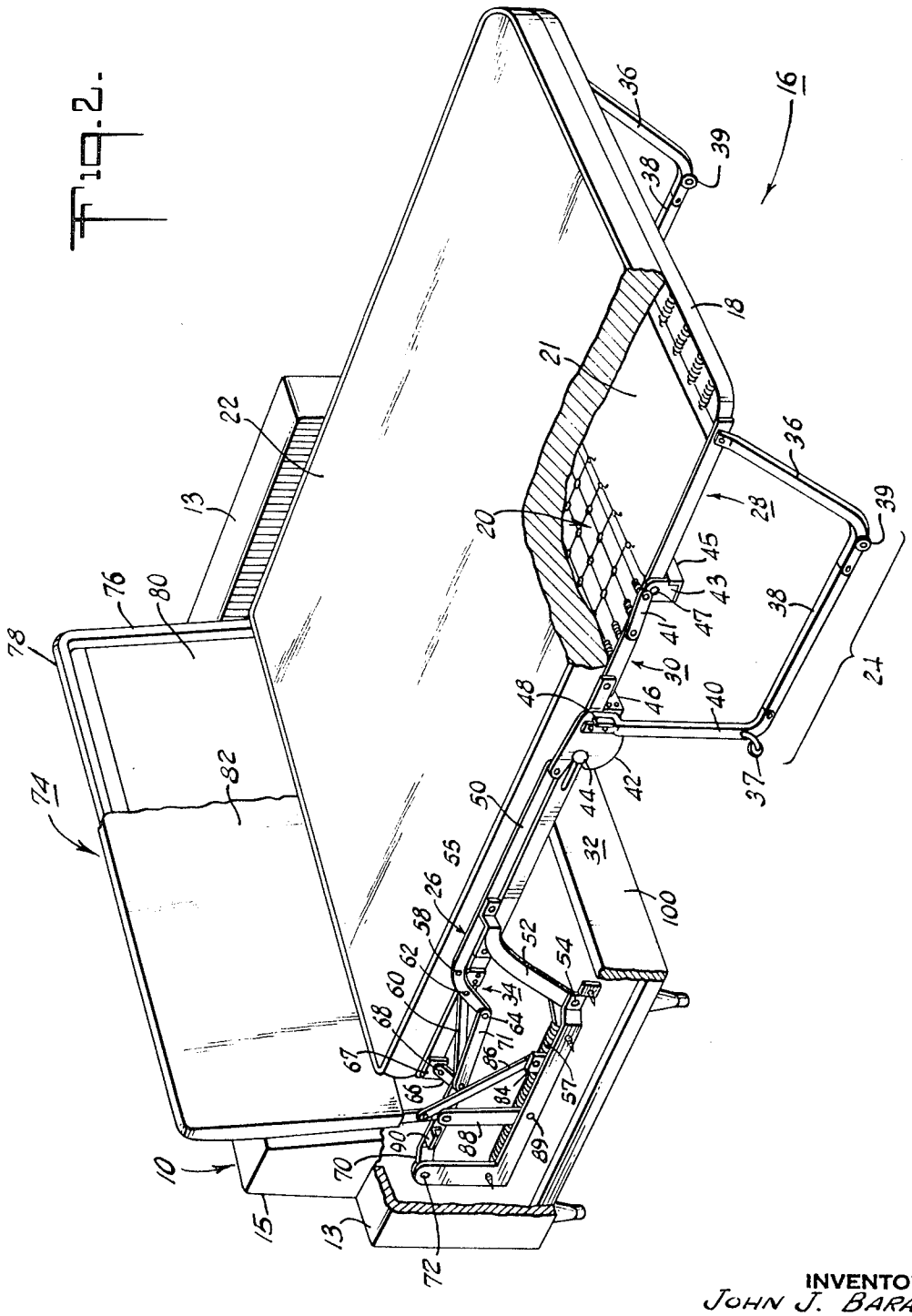


Fig. 5.



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Fig. 2.



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Fig. 3.

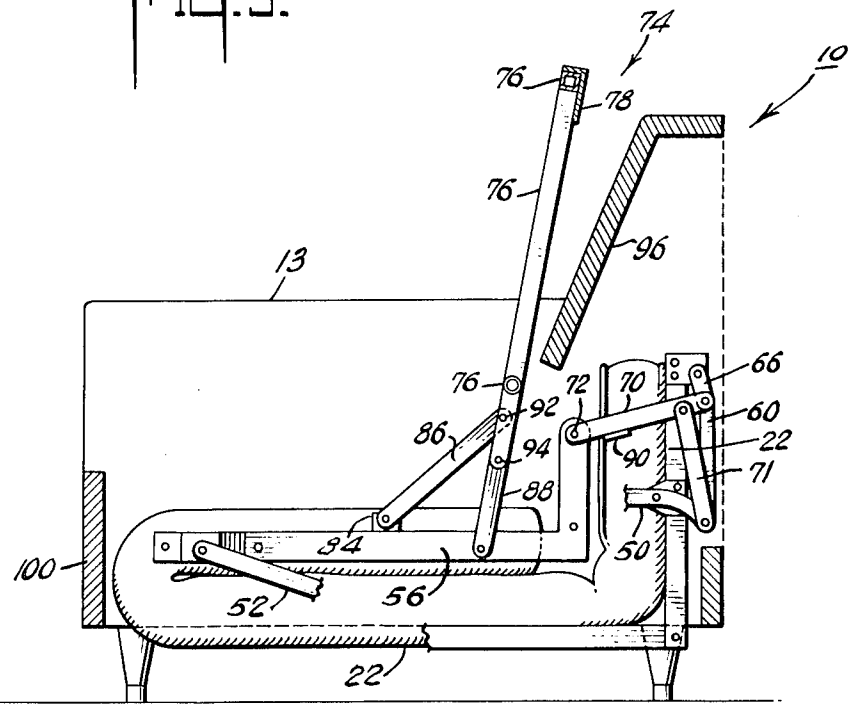
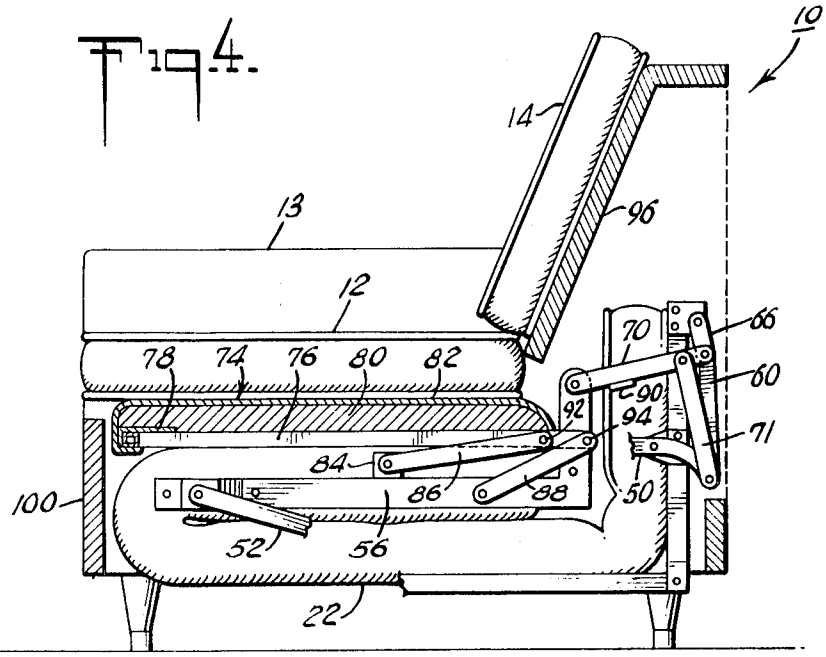


Fig. 4.



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HINGED-SEAT PLATFORM FOR SOFA-BED

This invention relates to convertible sofa-beds, and particularly to platforms for supporting the seat cushions of the sofa.

A recurrent problem in sofa-beds is that when the bed is folded and stored inside the sofa frame, and the sofa seat cushions are placed on top of the folded bed, the angular metal parts of the bed mechanism often can be felt by someone sitting on the sofa. This makes sitting on the sofa uncomfortable. Sofa-beds with protectors between the sofa cushions and the bed mechanism have been proposed in the past. However, storage of protectors when not in use has posed a further problem.

An object of the present invention is to solve the foregoing problems and provide a comfortable, easy-to-use and easily stored seat platform for sofa-beds.

In accordance with the present invention, the foregoing objects are achieved by the provision of a hinged platform which, when in its lower position, acts as a seat platform. When the seat platform is pivoted to its raised position, the storage problem is neatly solved by using the platform as the headboard for the bed, thus providing for use of the same structure for two different purposes. The hinge structure for the seat platform is constructed so that the pivot point of the seat platform is free to rise or fall as a person gets up from or sits down on the sofa.

Other objects and advantages of the present invention will be set forth in or apparent from the following description and drawings:

In the drawings:

FIG. 1 is a perspective view of a sofa-bed constructed in accordance with the present invention;

FIG. 2 is a partially broken-away view of the sofa-bed shown in FIG. 2, with the bed unfolded and the seat platform in its upright position;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 1 and showing the seat platform in its upright position;

FIG. 4 is a view like that of FIG. 3, but with the seat platform in its lowermost position; and

FIG. 5 is an enlarged view of a portion of the structure shown in FIG. 2.

Referring first to FIG. 1, the sofa-bed **10** includes an upholstered frame having a back **15** and arms **13** with removable seat cushions **12** and back cushions **14**. Beneath the seat cushions **12** is a cushioned seat platform **74**. The seat platform **74** separates the seat cushions **12** from the metal parts of the bed mechanism which are located directly below the seat platform **74**.

When it is desired to use the sofa-bed **10** as a bed instead of a sofa, the seat cushions **12** are removed, and, if the back cushions **14** are removable, they also are removed. Now referring to FIG. 2, the seat platform **74** is hinged at its rear corners and can be lifted up at its forward edge to the upright position shown in FIG. 2. Then, the bed mechanism stored beneath the seat platform is lifted and swung out of the sofa-bed frame until it is in the horizontal position shown in FIG. 2. When the bed is in this position, the seat platform **74** is positioned adjacent to the head of the bed so that it serves as a comfortably padded headboard for the bed. Thus, the platform need not be stored separately and apart from the bed, and performs a useful function when not being used as a seat platform.

Still referring to FIG. 2, the bed portion of the sofa-bed, indicated generally at **16**, includes a metal frame **18** which supports a spring-mounted wire mesh **20** which, in turn, supports a mattress **22**. A portion of canvas material **21** forms a portion of the mattress support structure at the outermost end or "-foot" of the bed.

The mattress frame **18** is divided longitudinally into four different sections, an outermost or foot section **28**, a linking section **30**, and intermediate section **32** and a head or innermost section **34**. At opposite sides of the bed are bed-folding mechanisms which perform the function of supporting the bed in its sleeping position and guiding it into folded position for storage in the sofa-bed frame. Each bed-folding mechanism is the mirror image of the other, so that only one such mechanism will be described.

Each bed-folding mechanism includes a forward linkage portion indicated generally at **24**, and a rear linkage portion indicated generally at **26**. The forward linkage portion includes a front leg **36** and an intermediate leg **40** pivotably connected together by means of a connecting member **38**. Rollers **37** and **39** are connected to the ends of legs **40** and **36**, respectively, in order to prevent scuffing of the floor or carpet on which the sofa-bed sits as the mechanism is being unfolded and folded. The upper end of leg **36** is pivotably connected to the forward portion of section **28** of the frame **18**. The upper end of leg **40** is secured to a cam plate **42** which is pivotably connected to a pusher link **50** which forms a part of the rear linkage **26**. A locking projection **44** fits into an indentation in the cam plate **42** to lock the bed in its open position. A tab **48** projects outwardly from the cam plate to abut against the connecting member **38** when the bed is folded up. A cross-support member **46** extends between opposite bed-folding mechanisms to give the bed lateral support.

The forward linkage just described operates to aid in folding and supporting the bed substantially in the manner described in U.S. Pat. No. 3,284,812 to P. Koch, and will not be further described herein.

An elongated plate **45** extends between two brackets **43** on opposite sides of the bed. The brackets **43** are pivoted to the foot section of the frame **18** at pivot point **47**. A link **41** is pivotably connected between the upper end of the plate **43** and the connecting section **30** of the frame **18**. When the sofa-bed is completely folded, the plate swings into a position on top of the front edge of the folded-up bed and prevents the seat cushions from being pressed downwardly between the front board **100** of the sofa frame and the folded bed mechanism. This feature is optional and need not be used unless desired. In any event, the link **41** causes the plate **45** to swing downwardly and away from the mattress support **20** so that the person sleeping on the bed will not feel the sharp edges of the plate.

The rear linkage **26** includes a mounting bracket **56** which is secured to the side of the sofa frame by means of screws or bolts. The rear or head portion of the bed is supported in the open position by means of a front support member **52** which is pivotably connected to the pusher link **50** at point **55**, and to the bracket **56** at point **54**. Conventional springs **57** are attached to the member **52** to provide a spring force which aids in opening and closing the sofa-bed, as is well known in the prior art. Also, referring to FIG. 5 as well as FIG. 2, the rear or head portion of the bed is supported by means of a rear link **70** which is pivotably connected at **72** to the mounting bracket **56**, and is pivotably connected at **75** to a swing link **66** and another link **60**. A further link **71** is pivotably connected to rear link **70** at point **73**, and is connected to the lower portion of the curved end of the pusher link **50** at point **64**. Link **60** is pivotably connected to link **50** at point **62**. Link **50** is pivotably connected at point **58** to the rear frame section **34** by means of an upstanding tab **53**. Swing link **66** is pivotably connected at point **68** to a downwardly extending tab **67** which is secured to frame member **34**.

Referring now to FIG. 3 as well as FIGS. 2 and 5, the rear linkage, including swing link **66** and the other links, operates to guide the sofa-bed mechanism in a relatively low trajectory so that it easily passes beneath the back-rest board **96** of the sofa frame. The back-rest board **96** extends to a relatively low position in order to facilitate the use of the loose back-cushions **14** shown in FIG. 1. If the board **96** is not relatively low, the lower edges of the back-cushions will be forced under the lower edge of the board **96**, and this will result in undesirable wear of the cushions and will detract from the appearance of the sofa. The position of the links of the rear linkage **26** when the bed is fully folded is shown in FIG. 3.

Referring again to FIG. 2, as well as to FIGS. 3 and 4, the seat platform **74** includes a tubular metal frame **76** to which is secured an L-shaped front edge plate **78**. A cushion **80**,

preferably of foam rubber or the like, fills the space between the sides of the frame **76**. A canvas and decorative fabric covering **82** holds the cushion and the frame together in a unit, and also makes an attractive headboard construction.

Referring particularly to FIGS. **5** and **2**, the hinge structure for the seat platform includes a pair of links **86** and **88** and pivotably secured to the frame **76** of the seat platform, and to the mounting bracket **56**. As is shown most clearly in FIG. **5**, the longer of the two links, link **86**, is pivotably connected at **81** to the frame **76**, and is pivotably connected at **85** to an upstanding tab **84** which is secured to the mounting bracket **56**. The shorter link **88** is pivotably connected to the bracket at point **89** which is horizontally spaced from the point **85** at which link **86** is pivoted to the bracket. The upper end of link **88** is pivotably connected to the lower end of the frame **76** at a point **83** which is spaced from the point **81**. An L-shaped tab **90** is secured to the rear link **70** at a position behind the rear link **88** of the hinge construction for the seat platform. Thus, when the seat platform is in its upright position, as is shown in FIGS. **2**, **3** and **5**, the tab **90** extends to a position behind the link **88** so as to block its rotation in a counter-clockwise direction. Because of the link **86**, the seat platform cannot fold downwardly unless the link **88** is free to rotate counter-clockwise. This prevents the seat platform from falling forward onto the bed. Thus, the combination of the hinge construction and the tab **90** provide a lock structure which locks the seat platform in its upright position.

When the bed has been folded, the link **70** swings rearwardly to the position shown in FIGS. **3** and **4**. This moves the lock tab at **90** away from the link **88** and permits the seat platform **74** to be folded down into the position shown in FIG. **4**.

The hinge linkage structure described above allows the pivot point of the hinge to move down or up when persons sit down on or rise from the sofa. The links **86** and **88** simply swing about their pivot points on the mounting bracket **56**, thus moving the pivot point for the seat platform **74** upwardly and downwardly. Thus, there is little strain on the seat platform and an extremely soft seat is provided.

The above description of the invention is intended to be illustrative and not limiting. Various changes or modifications in the embodiments described may occur to those skilled in the art and these can be made without departing from the spirit or scope of the invention.

I claim:

1. In a convertible sofa-bed, a seat platform to support the seat cushions of the sofa portion of said sofa-bed, a hinge mechanism for mounting said seat platform in said sofa-bed so as to be pivotable between a substantially upright position and a lower position in which said platform supports said seat cushions, said platform being positioned at the head of the unfolded bed and forming a headboard for said bed when said platform is in its upright position, a mechanism for folding and unfolding the bed of said sofa-bed, said mechanism having at least one link which swings into the frame of said sofa-bed when said bed is being folded, and locking means positioned on said link so as to be positioned to lock said seat platform in said upright position when said bed is unfolded.

2. Apparatus as in claim **1** in which said hinge means is positioned adjacent the backrest of said sofa-bed and at one edge of said seat platform.

3. Apparatus as in claim **1** in which said seat platform has a frame with cushioning material on both its upper and lower surfaces.

4. In a convertible sofa-bed having a bed-folding mechanism which swings into and out of the frame of said sofa-bed, a seat platform for supporting the seat cushions of said sofa-bed, means for mounting said seat platform in said frame so that said seat platform is pivotable between a cushion-supporting position and an upright position to form a bed headboard, locking means on said bed-folding mechanism and positioned adjacent said mounting means when said seat platform is in its upright position for locking said seat platform in said upright position, said locking means being secured to a portion of said bed-folding mechanism which swings away from said seat platform when said bed is being folded.

5. Apparatus as in claim **4** in which the portion of said bed-folding mechanism to which said locking means is secured is the rear swing-link.

6. In a convertible sofa-bed, a seat platform to support the seat cushions of the sofa portion of said sofa-bed, a hinge mechanism for mounting said seat platform in said sofa-bed so as to be pivotable between a substantially upright position and a lower position in which said platform supports said seat cushions, said hinge mechanism including means for allowing the pivot point of said seat platform to shift downwards when said platform is pressed downwardly.

7. Apparatus as in claim **6** in which said hinge mechanism includes at least one link pivotably connected between the frame of said sofa-bed and said seat platform.

8. In a convertible sofa-bed having a bed-folding mechanism which swings into and out of the frame of said sofa-bed, a seat platform for supporting the seat cushions of said sofa-bed, means for mounting said seat platform in said frame so that said seat platform is pivotable between a cushion-supporting position and an upright position, locking means on said bed-folding mechanism and positioned adjacent said mounting means when said seat platform is in its upright position for locking said seat platform in said upright position, said locking means being secured to a portion of said bed-folding mechanism which swings away from said seat platform when said bed is being folded, said mounting means comprising two pairs of links, one at each side of said platform, said platform including a frame with cushioning forming a substantially flat platform, each of the links in each pair of links being pivotably connected between said platform frame and said sofa frame at spaced-apart points, said locking means comprising a projection positioned to prevent one of said links from swinging about its sofa frame pivot point when said bed is unfolded.

9. In a convertible sofa-bed, a seat platform to support the seat cushions of the sofa portion of said sofa-bed, a hinge mechanism for mounting said seat platform in said sofa-bed so as to be pivotable between a substantially upright position and a lower position in which said platform supports said seat cushions, said hinge mechanism including means for allowing the pivot point of said seat platform to shift downwards when said platform is pressed downwardly, said hinge mechanism including at least one link pivotably connected between the frame of said sofa-bed and said seat platform, and another link pivotably connected to said seat platform at a point separated from the point at which the first link is connected, and pivotably connected to said frame at a point horizontally separated from the point at which the first link is connected to said frame.

10. In a convertible sofa-bed, a seat platform to support the seat cushions of the sofa portion of said sofa-bed, a hinge mechanism for mounting said seat platform in said sofa-bed so as to be pivotable between a substantially upright position and a lower position in which said platform supports said seat cushions, said hinge mechanism including means for allowing the pivot point of said seat platform to shift downwardly when said platform is pressed downwardly, said hinge mechanism including two links, one at each corner of said platform, mounting brackets at opposite ends of the frame of said sofa-bed, each link being connected between one of said brackets and said seat platform, said platform constituting a substantially flat cushion panel.

11. Apparatus as in claim **9** including a bed-folding mechanism having at least one link which swings into said frame during folding of the bed and swings to a position adjacent said seat platform when said bed is unfolded, and a projection on said bed-folding link, said projection extending adjacent one of said links of said hinge mechanism to block its movement and prevent said seat platform from falling from its upright position.

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