Sept. 29, 1942. M. F. BAYER ET AL 2,297,526

SOFA-BED

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Fig. 1

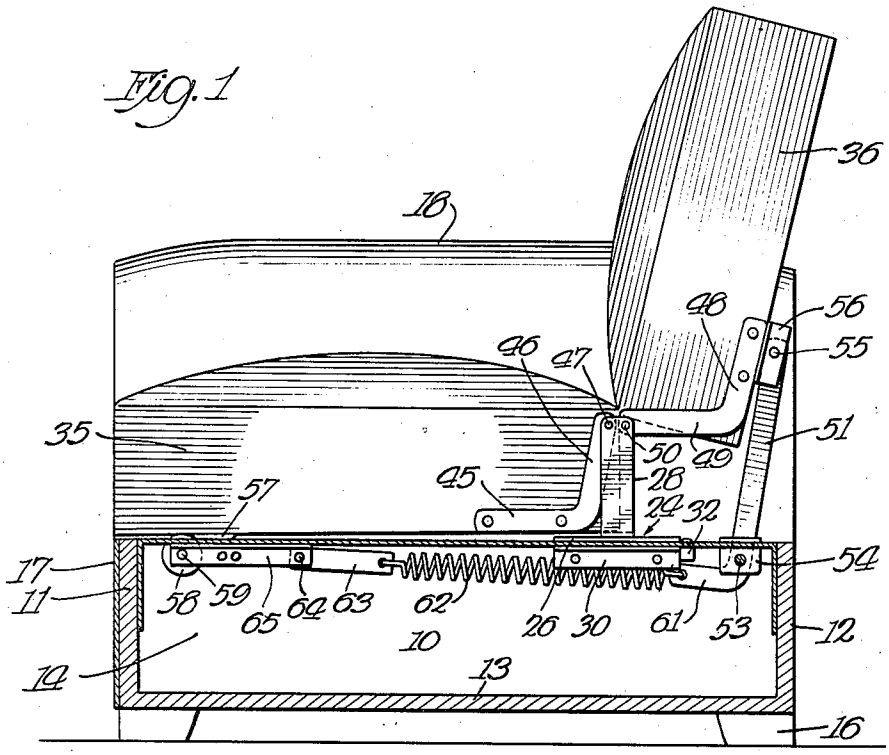
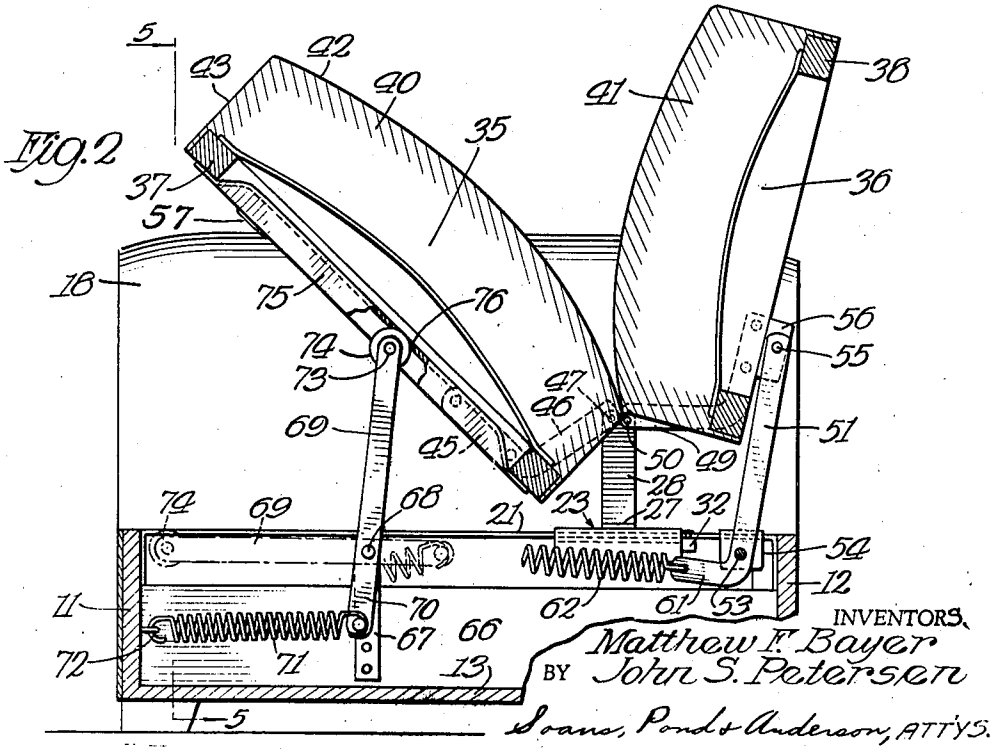


Fig. 2



INVENTORS,
Matthew F. Bayer
BY John S. Peterson
Soans, Pond & Anderson, ATTYS.

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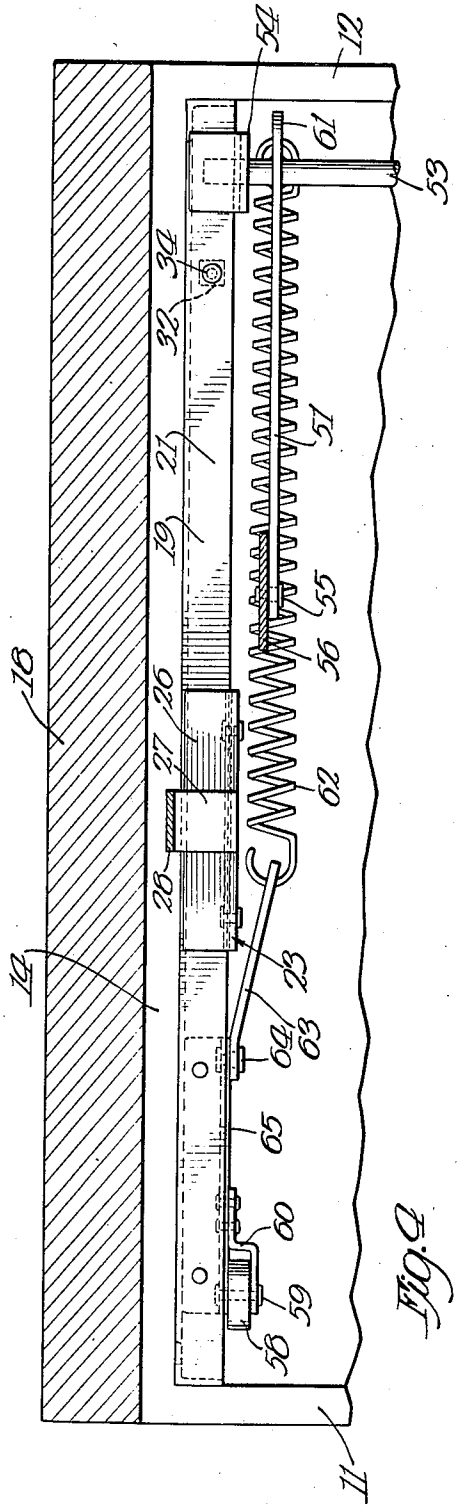


Fig. 4

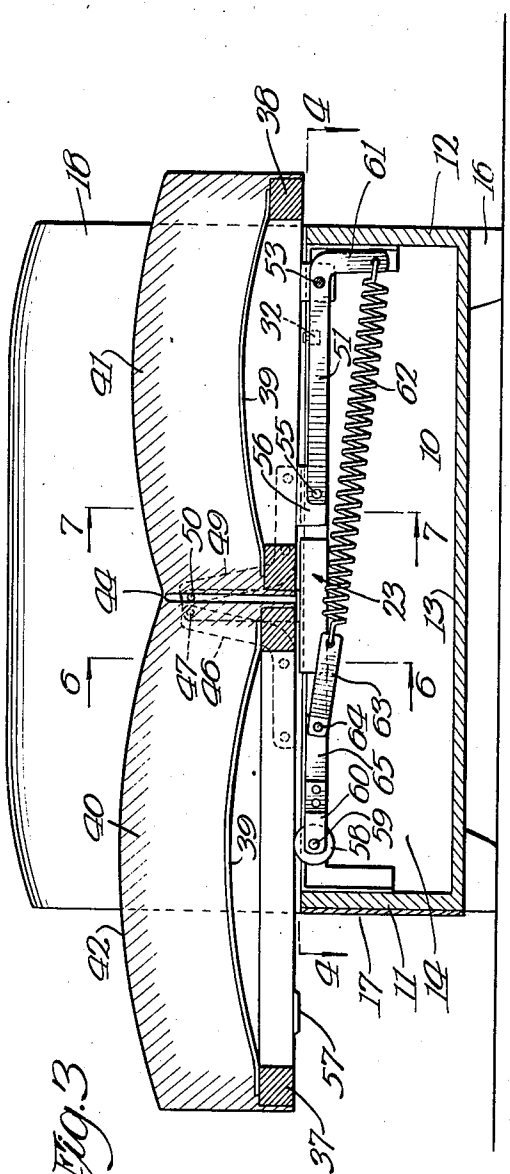


Fig. 3

INVENTORS
Matthew F. Bayer
BY John S. Peterson
Soans, Pond & Anderson, ATTYS

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Fig. 5

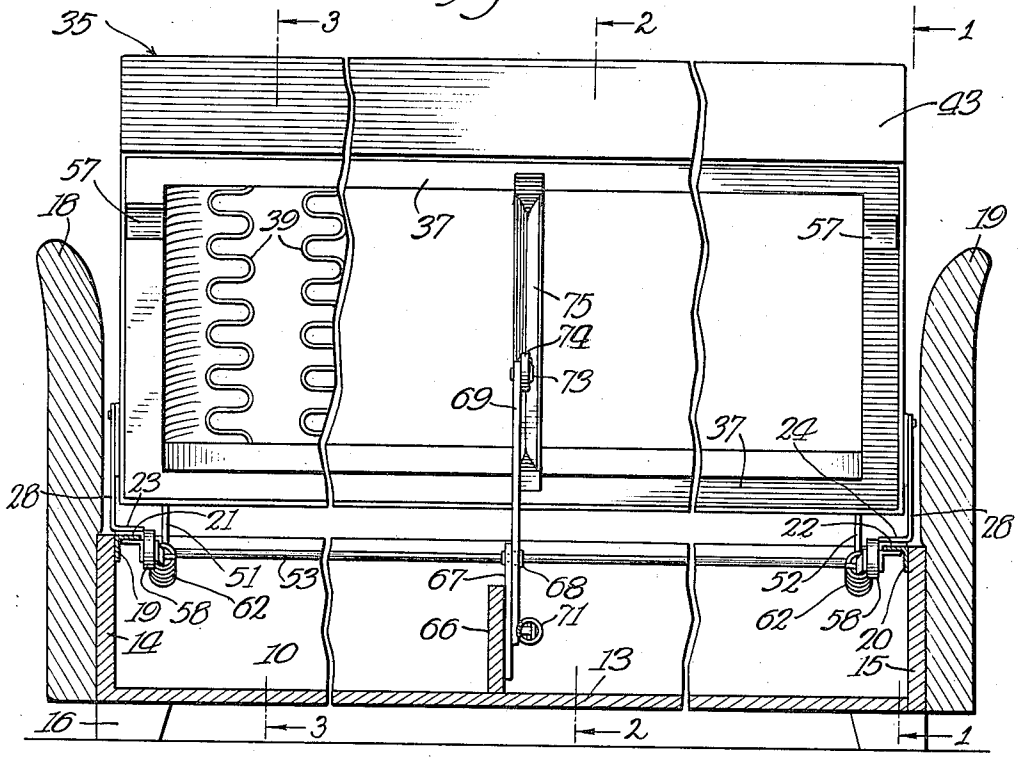


Fig. 6

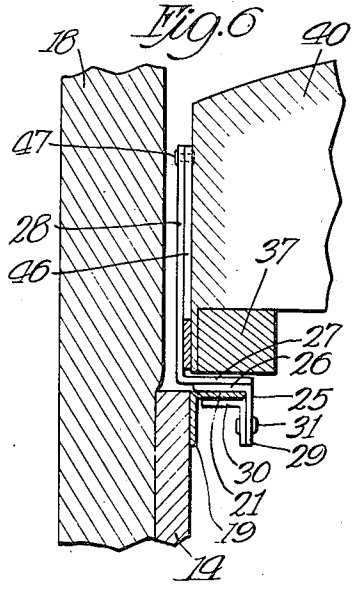


Fig. 7

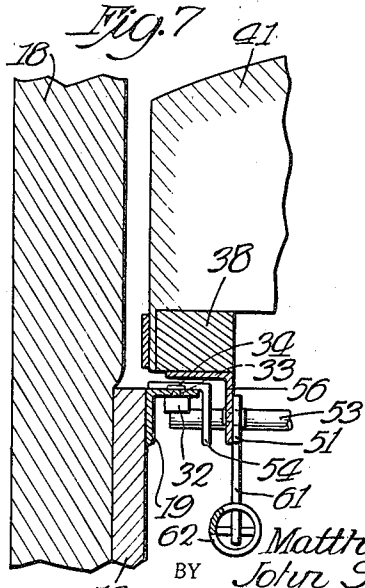
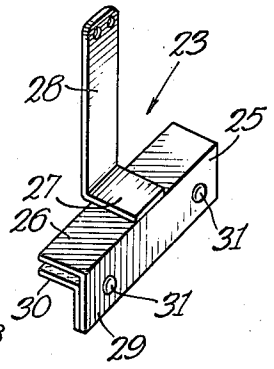


Fig. 8



INVENTORS.
Matthew F. Bayer
BY John S. Peterson
Evans, Pond & Anderson, ATTYS.

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UNITED STATES PATENT OFFICE

2,297,526

SOFA-BED

Matthew F. Bayer and John S. Petersen, Kenosha, Wis., assignors to Simmons Company, New York, N. Y., a corporation of Delaware

Application July 13, 1940, Serial No. 345,300

2 Claims. (Cl. 5—47)

The invention relates to improvements in sofa-beds and is particularly adapted for use in connection with a sofa having a seat section and a back section connected together so that the seat section when moved forwardly upon its base will cause the rear or back section to move into a horizontal position from its normal upright position, so as to form with the front or seat section an extension bed of normal double width.

The principal objects of the invention are to provide in a structure of the general class described an arrangement which will provide convenient access to a bedding compartment arranged in the base of the structure; to provide a structure in which the movements or manipulations required in converting the structure from a sofa to a bed, or vice versa, are relatively few, simple and requiring the application of little strength or labor; to provide an arrangement of the class described which is relatively comfortable when in its normal seat or sofa condition and which forms a comfortable sleeping surface when extended; to provide an arrangement of the class described which is stable, safe and fool-proof in either position; to provide a structure which is as attractive in appearance as it is utilitarian in function; and in general, to provide an improved sofa-bed of the character referred to.

In the drawings, which illustrate a preferred embodiment of our invention:

Fig. 1 is an end elevation of the structure, the end or arm having been removed so as to expose some of the mechanical details;

Fig. 2 is a view similar to Fig. 1 but showing the seat in raised position to afford access to the bedding compartment;

Fig. 3 is a view similar to Fig. 1 but showing the seat section and the back section co-planar so as to form a sleeping surface of normal double width;

Fig. 4 is a section taken on the line 4—4 of Fig. 3;

Fig. 5 is a section taken on the line 5—5 of Fig. 2;

Fig. 6 is a section taken on the line 6—6 of Fig. 3;

Fig. 7 is a section taken on the line 7—7 of Fig. 3; and

Fig. 8 is a perspective view of the slide and spacer.

Referring to the drawings, it will be observed that the base of the structure comprises a wooden box structure designated as a whole 10 and having a front wall 11, a rear wall 12, bottom wall 13, and end walls 14 and 15. Said box forms a bedding compartment as well as a stationary base for the structure and is preferably supported on a set of four feet 16 which desirably are not equipped with casters.

The front of the bedding section is preferably upholstered or covered with a layer or sheet of suitable flexible fabric 17 to match the fabric with which the upholstered portions of the structure are covered. Also, in order to conceal certain operating parts which would otherwise be exposed to view, so-called ends having upwardly extending arm rest portions 18 and 19 are secured in any suitable manner to the end walls 14 and 15.

To the end walls 14 and 15 of the base structure there are secured horizontally fore and aft extending angle iron tracks 19 and 20 in the form of angle irons having inwardly extending flanges 21 and 22, the upper surfaces of which are substantially flush with the top edges of the end walls 14 and 15.

Upon the tracks formed by the horizontal flanges 21 and 22 there are arranged to slide horizontally forwardly and rearwardly a pair of slide elements which are best shown in Figures 6 and 8. Each of these slide elements designated as a whole 23 and 24 comprises an angle iron 25 having an outwardly extending flange 26 overlying the stationary track flange, and on the upper face of the flange 26 there is secured, preferably by welding, the horizontally extending limb 27 of an L-shaped standard, the upper limb of which extends upwardly and substantially vertically as shown at 28.

To the depending flange 29 of the angle iron 25 there is secured a length of angle iron of smaller cross-section, said lesser angle iron 30 being secured to the depending flange 29 by means of rivets 31, sufficient space being provided between the outwardly extending flanges 30 and 26 to permit the slide element to slide freely upon its track flange 21 or 22, as the case may be. The lengths of the angle irons 25 and 30 are sufficient to avoid all danger of the slide elements binding upon the track when force is applied to the extreme upper end of the spacer limb or standard 28.

Rearward movement of the slide elements 23 and 24 is prevented by stops which preferably take the form of studs such as 32, the upper ends of which are reduced in diameter as shown at 33 in order to enable the studs to be riveted to the tracks as shown at 34.

The front or seat section designated as a whole 35 and the rear or back section designated as a whole 36 may be constructed in a similar manner

so far as the frame and upholstery features are concerned. For example, the base of the seat section 35 may be constructed of a rectangular open wooden frame 37 while the back section 36 is built upon a similar wooden frame 38. For convenience, the spring bottom or support for the bedding or upholstery comprises a series of spaced bow-spring units 39 which are covered with suitable fabric and to which the pads or mattress sections 40 and 41 may be secured. It is understood that the seat section 40 is covered with suitable upholstery cloth 42 having a skirt portion 43 tacked or otherwise secured to the outside of the frame 37. The back section is similarly treated so as to match the seat section.

The seat section 35 and the back section 36 are hinged together along an axis extending in the immediate vicinity of the general line of contact between the rear upper edge of the seat section and the lower front edge of the back section, and that point or axis of connection or pivotal movement is maintained or located a sufficient height above the top of the base structure so that when in seat or sofa position the sections may be in the normal sitting position shown in Figure 1, while when the sections are in extended or bed position as shown in Figure 3 there is no gap or space between the adjacent longitudinal edges of the hinge sections. In fact, if desired, the covering of the back section may be formed integral with or directly seamed to the covering 42 of the seat section as shown at 44 in Fig. 3.

For convenience, and in order to avoid the use of too many overlapping hinge parts, it is found desirable to hinge the two sections at points respectively spaced apart a slight distance. However, the effect is the same as though the sections were pivoted on a coincidental or common hinge axis as above described. This hinge connection is best shown in Figure 1 from which it will be seen that to the base of the seat section at its rear there is rigidly secured a boomerang-shaped strap member 45 having an upstanding leg part 46 hinged to the upper end of the spacer element 28 by a pin 47. Similarly, to the frame of the back section there is secured a similar boomerang-shaped piece 48 having a generally horizontally extending arm 49 pivoted to the spacer 28 by a pin 50 just in rear of the pin 47.

The movement of the rear section from seat position to bed position and vice versa is automatically effected when the seat section is drawn forwardly to its bed position as shown in Figure 3 or restored to its sofa position as shown in Figure 1, as the case may be. Such automatic mechanism comprises a pair of arms or links 51 and 52 mounted on the ends of the base structure adjacent its rear wall 12. These two arms or links arrangements 51 and 52 comprise a pair of levers rigidly united to a common equalizer rod 53, the ends of which are pivotally supported in small brackets 54 rigidly secured to and depending from the fixed track members 21 and 22.

The longer arms of the links 51, which normally extend upwardly as shown in Figure 1 when the device is in sofa condition, are pivoted at 55 to small brackets 56 secured rigidly to the underside of the end members of the wooden frame of the back section.

Improper forward movement of the seat section, when the structure is being used as a sofa, is prevented by affixing to the underside of the end members of the frame of the seat section, small plate-like members 57, the forward ends of which lock behind fixed rollers 58 when the seat section is pushed back into its rearmost position wherein the fixed stops 32 are engaged by the rear ends of the angle irons 30 of the slides (see Figure 1). Each of the rollers 58 is carried by a fixed pivot 59 mounted in a small bracket 60 (see Figure 4), secured to and near the forward end of the stationary track elements.

Certain auxiliary or accessory devices are employed to improve the utility, efficiency and ease of operation of the structure. For example, in order to facilitate the raising of the back section 41 from its extension position in Figure 3, to its upright or seat position in Figure 1, we form upon the ends of each of the arms or links 51 and 52, a small integral bell crank extension 61 which in the position shown in Figure 3 extends downwardly below the shaft 53. To the lower extremity of said depending bell crank arm 61 there is connected a powerful tension spring 62, the forward end of which is connected to the rear end of a floating link 63 mounted on a rivet 64 which is fixed in a small angle iron 65 carried by the inside of the track member.

With the arrangement described, the spring 62 has its maximum effect in tending to raise the seat section 41 to its upright position, from the co-planar position shown in Figure 3.

The seat section 40 can be rocked around the hinge axis to the extent of some 45° as shown in Figure 2, or more, when it is desired to obtain access to the pillows and bedding stored in the bedding compartment in the seat of the couch. Said bedding compartment as shown best in Figure 5 is divided into two parts by a transverse wall 66 which extends between the front and rear walls 11 and 12 of the bedding compartment.

To one side of said middle wall 66 there is rigidly secured an upstanding strap or bracket 67, to the upper end of which there is fixed a pivot pin 68. The pin 68 constitutes a pivotal support for a two-ended lever 69, the lower end 70 of which is connected to one end of a coil spring 71, the other end of said coil spring being connected by a screw eye 72 to the front wall 11 of the base structure. The upper end 69 of the lever carries a pin 73 which constitutes a journal for the roller 74. Said roller 74 engages the under side of a transverse angle iron 75 which extends across and between the front and rear members of the base frame of the seat section 40. The angle iron 75 is disposed with its apex at the top so as to form an inverted V for properly guiding the roller 74 and maintaining the latter in proper engagement with the angle iron 75.

The dimensions and fit of the parts just described are such that the roller 74 under the influence of the lever 69 and the spring 71 will snap rearwardly into a slot 76 in the crotch of the said angle iron 75 when the seat is raised into the position shown in Figure 2 for easy access to the bedding compartment.

The spring 71 is strong enough to hold the seat in such elevated or inclined position when the roller 74 is located in the slot 76, and it is also powerful enough to assist materially in raising the seat into its inclined position when access to the bedding compartment is desired.

We claim:

1. A sofa bed of the class described comprising a base constituting a bedding box, a seat section, a back rest section, means for mounting said seat section and back rest section on said base for movement from normal seat and back rest positions, respectively, to co-planar bed

position overlying said base, said means comprising a forwardly and rearwardly extending track fixedly mounted on said base, a slide engaging said track and movable forwardly and rearwardly thereon and disposed adjacent the rear end of said track when the seat and back rest are in said normal positions, a standard extending upwardly from said slide, an axially horizontal pivot connection between said seat section and the upper end portion of said standard, said connection being approximately horizontally aligned with the upper rear portion of the seat section and serving to permit the front portion of the seat section to be swung upwardly about said pivot connection to an open position for affording access to said bedding box, means for supporting said seat section in such open position, said means comprising an arm pivoted to said base and having a free end engaging a portion of said seat section, spring means normally urging said arm to swing upwardly at its free end, thereby to counterbalance the weight of said seat section so as to facilitate upward swinging thereof, and a track carried by said seat section for engagement with said free arm end, said spring actuated arm and said track being so arranged that said arm is automatically returnable to lowered position against the force of said spring means as an incident to closing movement of the seat section about the pivot mounting of the seat section and incident to horizontal movement of said seat section while in opened position, the return movement of said arm in the latter event serving also to permit gradual lowering of the seat section to closed or bed position as horizontal movement of the section toward bed position progresses, an axially horizontal pivot connection between said back rest section and the upper end portion of said standard, said last-mentioned connection being spaced rearwardly from the connection between said seat section and standard and being approximately horizontally aligned with the lower front portion of the back rest, an arm pivotally connected adjacent its upper end to said back rest intermediate the upper and lower edges thereof and pivotally connected adjacent its lower end to said base adjacent the rear thereof, an extension on said arm projecting forwardly from the pivot connection between said arm and base, spring means connected between the front end of said arm extension and the base for yieldably resisting movement of said arm from a predetermined position, thereby to yieldably resist movement of the back rest from normal back rest position, said spring means and said arm serving, through said back rest and the interconnection of said back rest and seat section by said standard, to control movement of said seat section to bed position.

2. A convertible couch comprising a seat section, a back section, a hinge connecting said sections for relative folding movement on a horizontal axis substantially coinciding with the upper rear edge of the seat section and the lower front edge of the back section, a bedding box, means for mounting said hinge on said bedding box for movement forwardly and rearwardly relative to the base, whereby said seat and back sections are adjustable from normal seat and back position on said bedding box to co-planar bed position thereon, means for releasably holding said sections in normal seat and back position, said seat section, when in seat position, being swingable upwardly at its front edge to an open position for affording access to said bedding box, and means for supporting said seat section in such open position comprising an arm pivoted to said base and having a free end engaging a portion of said seat section, said means comprising an arm pivoted to said base and having a free end engaging a portion of said seat section, spring means normally urging said arm to swing upwardly at its free end, thereby to counterbalance the weight of said seat section so as to facilitate upward swinging thereof, and a track carried by said seat section for engagement with said free arm end, said spring actuated arm and said track being so arranged that said arm is automatically returnable to lowered position against the force of said spring means as an incident to closing movement of the seat section about the pivot mounting of the seat section and incident to horizontal movement of said seat section while in opened position, the return movement of said arm in the latter event serving also to permit gradual lowering of the seat section to closed or bed position as horizontal movement of the section toward bed position progresses.

JOHN S. PETERSEN.
MATTHEW F. BAYER.