Oct. 14, 1952 A. LORENZ 2,613,370

CONVERTIBLE SOFA SEAT AND BED

Filed Dec. 2, 1948 2 SHEETS—SHEET 1

Fig. 1.

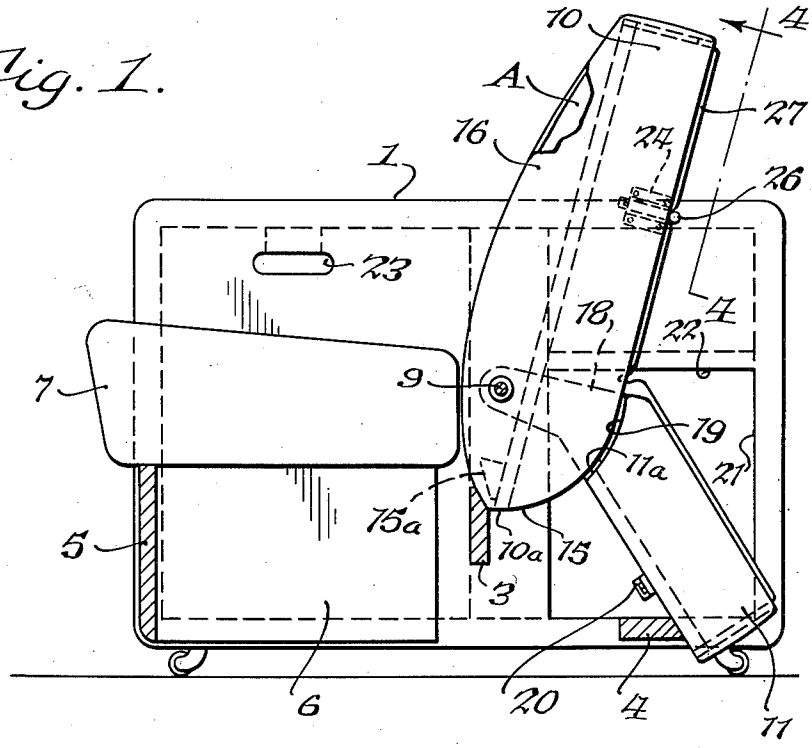
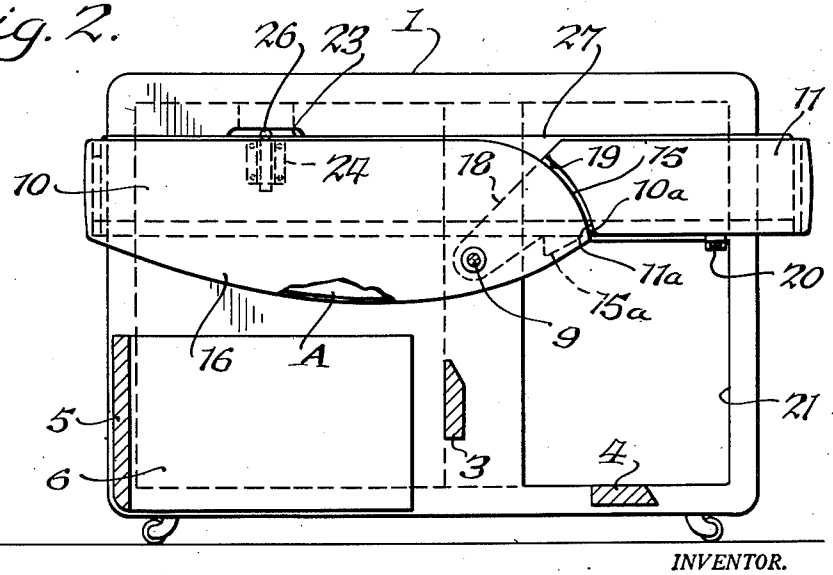


Fig. 2.



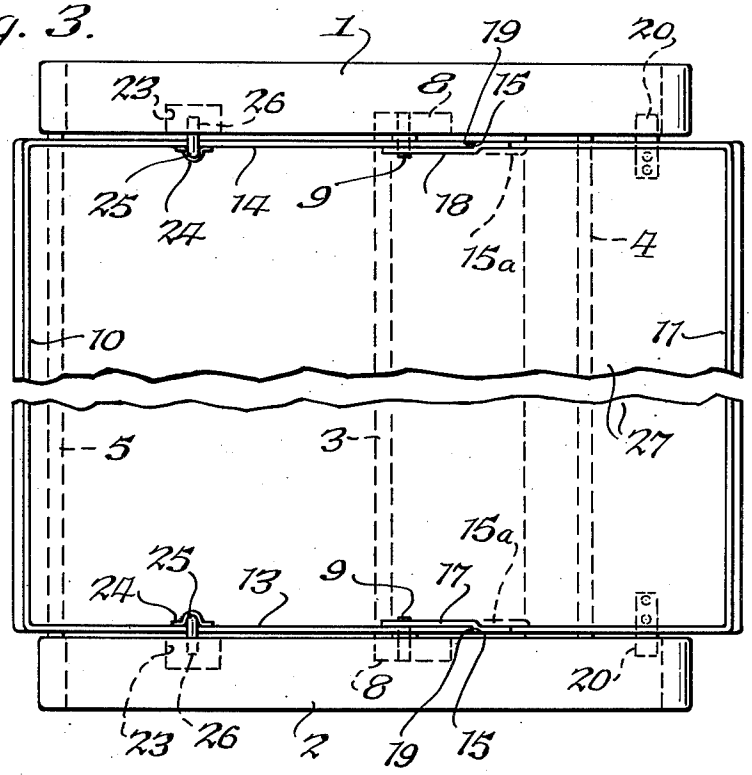
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Fig. 3.



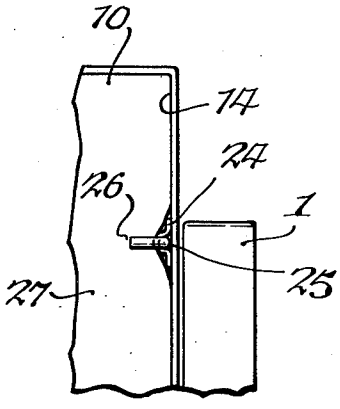
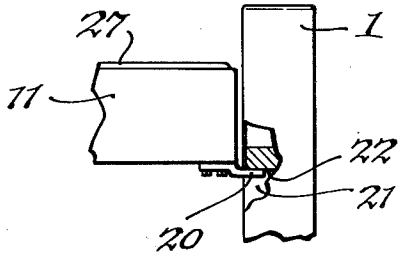


Fig. 4.

Fig. 5.



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CONVERTIBLE SOFA SEAT AND BED

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7 Claims. (Cl. 5—43)

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This invention relates to articles of furniture, and particularly to sofa beds that are convertible from an ordinary sofa seat to a bed and vice versa by simple manipulations.

An object of this invention is to provide an improved sofa bed of approximately the size and proportions of an ordinary sofa seat or davenport, which may be converted, with a minimum of effort and manipulations, from a sofa seat to a comfortable bed and vice versa; which will present an attractive appearance and be comfortable as a sofa seat, with the seat at the usual level of sofa seats; which may be made up as a bed ready for use and then converted into a sofa seat; which will require a minimum of operating effort; which will be stable when converted into a bed; with which the mattress will be at a normal level when the device is converted into a bed; and which will be relatively simple, convenient, compact, practical and inexpensive.

Various other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawing:

Fig. 1 is a transverse sectional elevation through a sofa bed embodying this invention, and made up as a sofa seat, the section being taken along the inner face of an end member,

Fig. 2 is a similar view but with the device converted for use as a bed;

Fig. 3 is a plan of the sofa bed, open as a bed, as shown in Fig. 2;

Fig. 4 is a part of the rear elevation of the sofa bed, as shown in Fig. 1 on line 4—4, and

Fig. 5 is a rear elevation of a part of the same, with a portion broken away to show certain details of construction.

In the illustrated embodiment of the invention, the improved combination sofa bed includes a support having upright end members 1 and 2, Fig. 3, which are rigidly connected together by an intermediate portion formed by a plurality of cross members 3, 4, and 5, so that the end members and interportion form a basic structure or framework. Disposed behind the cross member 5 is a storage box 6 in which extra bedding and the like may be stored, and a suitable sofa cushion or seat rests removably upon the upper edge of the cross member 5, with its rear edge upon the rear upright wall of the storage box 6. The cushion or seat 7 is removed by merely lifting and moving it away from the frame, when the device is to be converted into a bed, and is to be replaced when the device is reconverted into a sofa seat. The inner faces of the end members 1 and 2 are provided with bearings 8 which carry bearing studs 9 having their axes when extended, substantially coincident. The bearings 8 are countersunk into the inner faces of the members 1 and 2, so that the studs or trunnions 9 project toward each other in axial alinement.

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A shallow box is disposed between the end members 1 and 2 and is formed of a front section 10 and a rear section 11 articulately connected. The side walls of both sections are pivoted on the trunnions 9 so that the latter form an articulated connection or hinge between the sections and support them on the end members. The bottoms of the two sections of the box have their adjacent edges 10*a* and 11*a* abutting approximately edge to edge when the two sections are both in horizontal positions, as shown in Figs. 2 and 3.

The end walls 13 and 14 of the front section 10 extend rearwardly beyond the trunnions 9 for a substantial distance and terminate in arcuately curved convex edges 15, the center of curvature of each arcuate edge 15 being approximately in the axis of the adjacent one of the trunnions 9. The box, however, is disposed entirely at one side of the axes of trunnions 9, but the end walls 13 and 14 extend below the bottom wall of the box to form side rails 16 that are pivoted on the trunnions 9 and provide end pieces between which a soft cushion A is disposed and suitably confined against the bottom wall of the box. Cushion A serves as the back rest of the sofa seat when the box section 10 is in upstanding position, as shown in Fig. 1.

The rear box section 11 has the forward arms of its end walls offset slightly as at 17 and 18, Fig. 3 so as to overlap and extend along the inside faces of the end walls 13 and 14 of the forward section 10.. These arms 17 and 18 also extend angularly, as shown in Figs. 1 and 2, and are pivoted on the trunnions 9. Each of the end walls of the rear section 11 is provided at the beginning of the offset arm 17 or 18 with a concave seat 19, Fig. 1, which has a center of curvature approximately at the axis of the trunnions 9. Each concave seat 19 lies close to the adjacent convex edge 15. The sections of the box may thus make an acute dihedral angle with each other when the forward section 10 is rocked on the trunnions so as to be inclined upwardly and slightly rearwardly, as shown in Fig. 1.

The upward and rearward rocking of the front

section 10 on trunnions 9 is limited by the engagement of the lower ends of the end rails 16 with the cross member 3, as shown in Fig. 1. At this time the rear edge of the removable cushion 7 approximately abuts against the cushion A and the sides of the end walls. When the front section 10 is rocked into the upstanding position shown in Fig. 1 from the horizontal position shown in Fig. 2, the rear section 11 is free to descend below trunnions 9, downwardly and rearwardly, into the position shown in Fig. 1 where it is entirely disposed between the front and rear edges of the end members 1 and 2. At this time the rear section rests against and is supported by an edge of the cross member 4. When the parts are disposed in the positions shown in Fig. 1, the device is useful and comfortable as a sofa seat, with seat 7 at normal sofa seat level, and when disposed in the positions shown in Figs. 2 and 3, the device is comfortable and useful as a bed, with the mattress at the normal mattress level for beds.

When the front section 10 is rocked forwardly from the sofa seat position of Figure 1, stops 15*a* on the side walls 13 and 14 engage against the lower edges of the arms 17 and 18 of the rear section 11 and rock the rear section 11 with it upwardly into the horizontal position shown in Fig. 2. An angle member or lug 20 is secured on the bottom of the rear section 11, adjacent each end member 1 and 2, and the free end of each lug 20 extends toward the adjacent end members 1 or 2 and moves in recess 21 provided in the rear part of the inside face of the adjacent end member 1 or 2. Each lug 20 engages against the upper wall 22 of the recess 21 into which it projects, when the rear section 11 becomes horizontal, and this limits the movement of both sections of the box beyond a horizontal position, where the two sections make a straight angle with each other. The dihedral angle between the box sections thus varies from an acute angle, as shown in Fig. 1, to a straight angle, as shown in Fig. 2.

The end members are also provided in their inner faces with recesses 23 adjacent to the upper edges thereof, and a bearing 24 on the inside face of each of the end walls 13 and 14 of the front box section 10 rotatably supports a latch rod 25, see Fig. 3. Each of these rods 25 has its upper or outer end bent laterally to form an arm 26 that may enter a recess 23 when the forward box section 10 is in its horizontal position, as shown in Fig. 2. This locks the box in the horizontal or straight angle position.

Confined in any suitable manner in the articulate, shallow box is a flexible mattress 27, Figs. 1 and 2, but when the arms 26 are rotated out of the recesses 23 through angles of 180 degrees, they will overlie the outer faces of the mattress 27 and confine it in the forward section 10 and from falling out when the forward section 10 is swung upwardly into the position shown in Fig. 1. When the box sections 10 and 11 move into the acute angle position shown in Fig. 1, the mattress will be somewhat flexed at the junction between box sections, as shown in Fig. 1, but will remain in the box sections. It will be understood that blankets may be confined on the mattress in any suitable manner so that the bed will be ready for use whenever the article is converted from the sofa seat position shown in Fig. 1 to the bed position shown in Fig. 2.

It will be noted that very little effort is required to rock the front section 10 forwardly from its position shown in Fig. 1, because the

weight is then carried largely on the trunnions, and during such rocking, soon after the center of gravity of the front section 10 passes a vertical plane through the axis of the trunnions 9, the section 10 will tend to fall by gravity, but immediately it will engage and pick up the section 11, which serves to partially or largely counterbalance it. Thus, very little effort will be required to move the section 10 forwardly into the horizontal or bed position, or to return it to the upright or sofa seat position. It will be noted that there is only a simple locking element at each end to be manipulated in order to secure the box in the horizontal position shown in Fig. 2, or to release it, and the manner of fastening and unlocking the box is so simple that even a child may manipulate it and convert the device to either a sofa seat or a bed.

It will be understood that various changes in the details and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A sofa-bed comprising a support having upright end members connected by an intermediate portion, a shallow box formed of two articulately connected sections, a pair of axially alined trunnions, one adjacent each end member, and hingedly connecting adjacent sides of said sections, said end members supporting said trunnions and through them pivotally supporting said sections, one of said sections extending beyond the trunnions, and engageable with the other section, to cause movement together of the sections after they reach alined relation, a flexible mattress disposed in said box, said intermediate portion being formed to support a seat cushion removably thereon forwardly of said trunnions, said one section being rockable about said trunnions between an upstanding position with a face approximately abutting the rear edge of said seat cushion where it forms the back rest of a sofa seat, and forwardly and downwardly into an approximately horizontal position forwardly of said trunnions after said seat cushion has been removed, said other section and said support having cooperating stop parts for limiting rocking of said box beyond a horizontal position when said one section moves forwardly into horizontal position, and a locking element on said box at each end thereof and shiftable from one position in which it clears said support and overlies said mattress to confine it to said box, to another position in which it engages said support to prevent raising of said one section from its horizontal position.

2. A sofa-bed comprising a support having upright end members connected by an intermediate portion, a shallow box of two sections disposed between said members, hinged together on an axis that extends between said members, and hinged on the same axis to said end members intermediate the latter's front and rear edges, one of said sections being rockable on said axis forwardly from an upstanding position to an approximately horizontal position, and vice versa, the other section being rockable on said axis between a horizontal position and a rearwardly and downwardly inclined position, said one of said sections having a portion that overlaps and is engageable with the other section to cause movement together of said sections after they

form approximately a straight angle as said one section moves towards horizontal position, a flexible mattress disposed in said box and exposed and facing upwardly when the sections are horizontal, a stop carried by said one section and movable into and out of locking engagement with said support when said one section is in said horizontal position, and a seat cushion removably supported on said support between said members and abutting at its rear edge against said one box section when that section is upstanding and removable when one desires to move said one section into its said horizontal position.

3. A sofa-bed comprising a support having upright end members connected by an intermediate portion, a shallow box of two sections disposed between said members, hinged together on an axis that extends between said members, and hinged on the same axis to said end members intermediate the latter's front and rear edges, one of said sections being rockable on said axis forwardly from an upstanding position to an approximately horizontal position, and vice versa, the other section being rockable on said axis between a horizontal position and a rearwardly and downwardly inclined position, said one section having a portion that during its movement towards horizontal position engages with the other section when they are in straight alinement to cause movement of said sections together during continued movement of said one section into horizontal position, a flexible mattress disposed in said box and exposed and facing upwardly when the sections are horizontal, a stop carried by said one section and movable into and out of locking engagement with said support when said one section is in said horizontal position, and a seat cushion removably supported in said support between said members and abutting at its rear edge against said one box section when that section is upstanding and removable when one desires to move said one section into its said horizontal position, said axis being at a level below the bottom of said box when said box sections are horizontal.

4. A sofa-bed comprising a support having upright end members connected by an intermediate portion, a shallow box of two sections disposed between said members, hinged together on an axis that extends between said members, and hinged on the same axis to said end members intermediate the latter's front and rear edges, one of said sections being rockable on said axis forwardly from an upstanding position to an approximately horizontal position, and vice versa, the outside face of the bottom wall of said one section having a cushion formed thereon to serve as a back rest of a sofa when that one section is upstanding, the other section being rockable on said axis between a horizontal position and a rearwardly and downwardly inclined position, one of said sections having a portion that engages with the other section and picks it up to move it when the sections are in a straight alinement during movement of said one section toward horizontal position, a flexible mattress disposed in said box and exposed and facing upwardly when the sections are horizontal, a stop carried by said one section and movable into and out of locking engagement with said support when said one section is in said horizontal position, and a seat cushion removably supported on said support between said members and abutting at its rear edge against said one box section when that section is upstanding and removable when one desires to move said one section into its said horizontal position.

5. A sofa-bed comprising a support having upright end members connected by an intermediate portion, a shallow box of two sections disposed between said members, hinged together on an axis that extends between said members, and hinged on the same axis to said end members intermediate the latter's front and rear edges, one of said sections being rockable on said axis forwardly from an upstanding position to an approximately horizontal position, and vice versa, the other section being rockable on said axis between a horizontal position and a rearwardly and downwardly inclined position, the end walls of said one section extending rearwardly of said axis, when that section is horizontal, and having upwardly and rearwardly facing, convex, arcuate free edges, and said other section having downwardly and forwardly facing concave arcuate recesses in its end walls receiving said convex edges of said one section, said one section having parts engageable with said other of said sections, when the sections are in straight out alinement, to cause movement together of said sections after they are in straight alinement and said one section continues to move toward horizontal position, a flexible mattress disposed in said box and exposed and facing upwardly when the sections are horizontal, a stop carried by said one section and movable into and out of locking engagement with said support when said one section is in said horizontal position, and a seat cushion removably supported on said support between said members and abutting at its rear edge against said one box section when that section is upstanding and removable when one desires to move said one section into its said horizontal position.

6. A sofa bed comprising a support, a mattress-supporting frame hinged to said support and formed of hingedly connected front and rear sections, said front section being rockable on its hinge connection to said support between an upstanding position and a horizontal position forwardly of the rear section, the rear section being rockable on its connection to the front section between a downwardly and rearwardly inclined position and a horizontal position, said sections having interengaging portions by which said front section engages and carries with it said rear section during movement of the front section towards horizontal position, after the front section reaches a straight angle alinement with the rear section, a flexible mattress confined to that face of said frame which is uppermost when the frame is horizontal, a seat cushion removably mounted on said support in front of the upstanding front section, and latching means releasably coupling said frame and support for limiting movement of said frame from its said horizontal position.

7. A sofa bed comprising a support having end members connected by an intermediate portion, a mattress supporting frame having two sections disposed between said end members and arranged edge to edge from front to rear of the support, said sections being hinged at their ends to said support for rocking on a common axis, the front section rocking between a horizontal bed position and an upstanding and rearwardly inclined sofa position, the rear section normally rocking into a rearwardly and downwardly inclined position, but movable into a horizontal position, said front section having a portion engageable with the

rear section, while the front section is moving from its upstanding sofa position towards bed position, when the sections are in straight alinement with each other, to cause the rear section to move into horizontal bed position as the front section moves into bed position, a flexible mattress confined to that face of the frame which is uppermost when the frame is horizontal, the lower face of the front section, when horizontal, being formed as a back rest of the sofa, said support in the space between the end members being formed to support a sofa seat cushion forwardly of the lower edge of said front section when the latter is upstanding, and means to secure the frame releasably in horizontal bed position.

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