May 15, 1956 B. VALE 2,745,467

RECLINING BED CHAIRS

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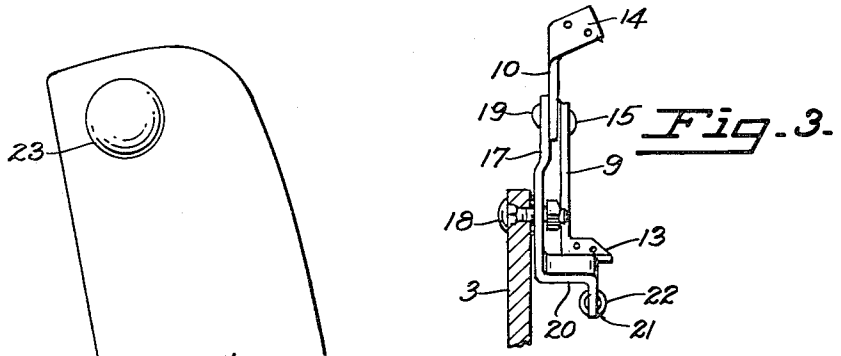


Fig. 3.

Fig. 1.

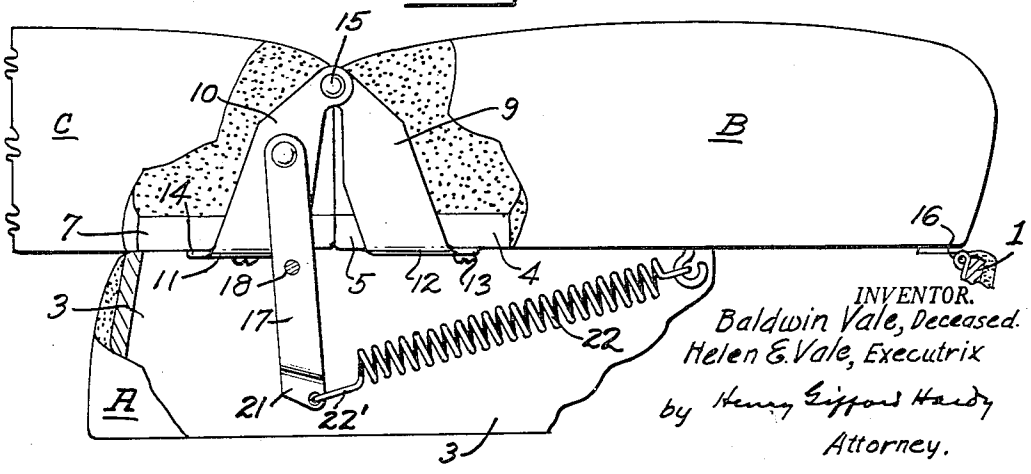


Fig. 2.

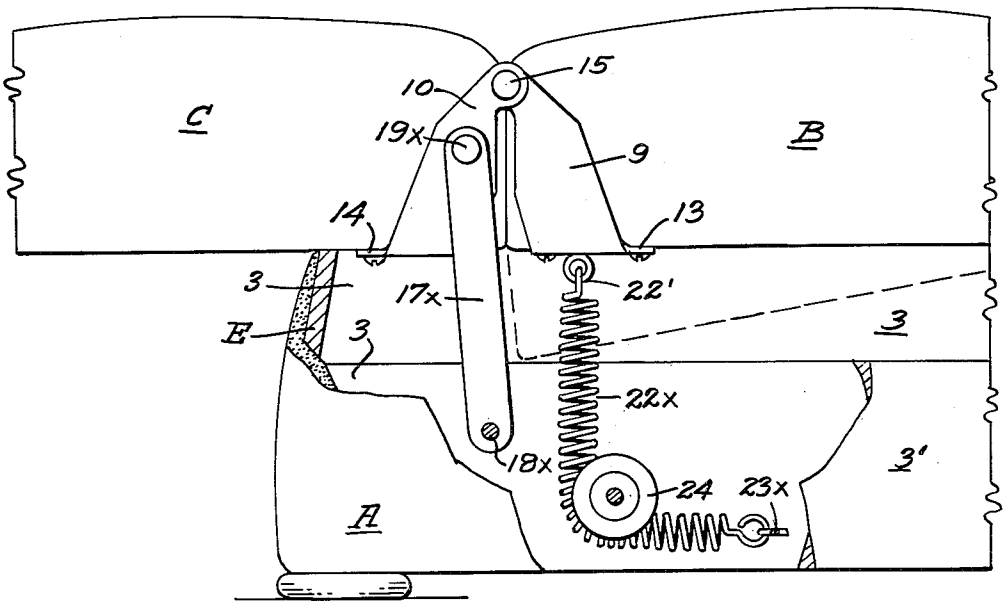
INVENTOR.
Baldwin Vale, Deceased.
Helen E. Vale, Executrix
by Henry Gifford Hardy
Attorney.

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Fig.4.



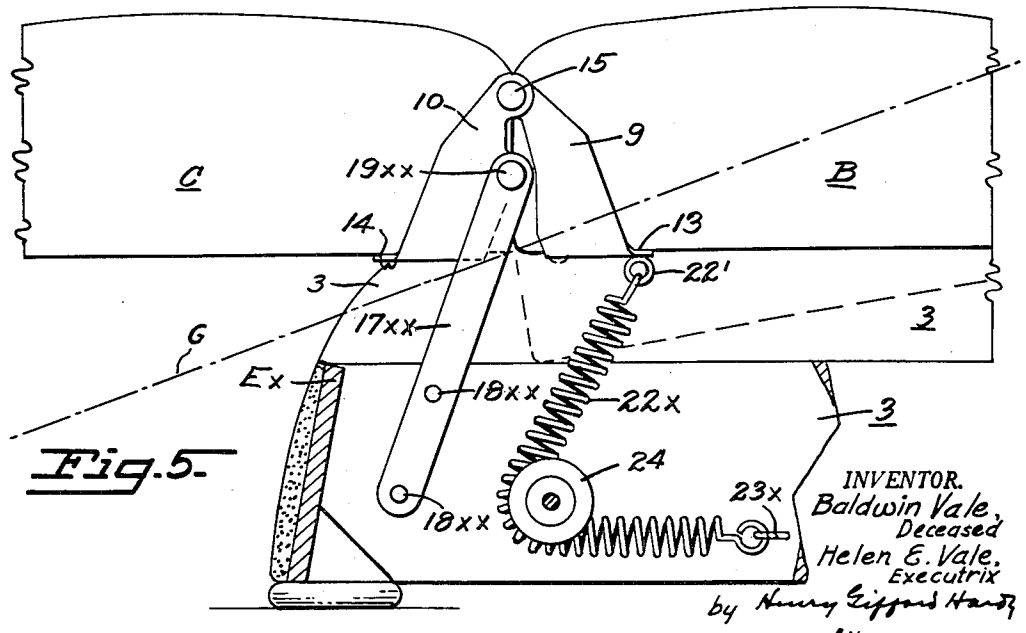


Fig.5.

INVENTOR.
Baldwin Vale,
Deceased
Helen E. Vale,
Executrix
by Henry Gifford Hardy
Attorney.

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RECLINING BED CHAIRS

Baldwin Vale, deceased, late of San Francisco, Calif., by Helen E. Vale, executrix, San Francisco, Calif.

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3 Claims. (Cl. 155—45)

Among the objects of the invention is the provision of a reclining chair capable of following the changing postures of the occupant from the sitting position to a full horizontal reclining position.

Another object is the provision of a chair having its seat and back hinged together for relative movement from an acute angle to a full horizontal alinement and a greater tilted angle.

Another object is the provision of a spring control in the structure for restoring the seat and back portions to the normal upright angular relation to each other when not occupied.

Another object is the provision of a chair having its seat and back hinged together and supported upon a pivot and a fulcrum in such a manner that the weight of the sitter applied to the seat will determine the pressure applied to the back and the fulcrum.

A further object is the provision of a reclining chair so constructed and arranged that arm supports for the sitter are not required to conceal the functional control mechanism.

Other objects and advantages will appear as the description proceeds.

In the specification and the accompanying drawings the invention is disclosed in its preferred form. But it is to be understood that it is not limited to this form; because it may be embodied in modifications within the spirit of the invention as defined in the claims following the description.

In the one sheet of drawings:

Fig. 1 is a side elevation of an armless reclining chair constructed in accordance with this invention, and shown in the normal sitting position, certain portions being broken away in vertical section to disclose the combinative elements and the supporting base of the chair.

Fig. 2 is a fragmentary detail showing the parts in the horizontal position.

Fig. 3 is a detached detail of the hinge assembly on one side of the seat and back, viewed from the rear of Fig. 1.

Fig. 4 is a side elevation similar to Fig. 2, of a modified form of the hinge assembly.

Fig. 5 is a similar view of the same with the hinge arranged to lock the back and seat in the horizontal position.

In detail the structure shown in Fig. 1 comprises the substantially rectangular base A, open at the top and bottom and having the vertical front and back **1** and **2** joined by suitable side boards such as **3**, **3'**. The base may be constructed to meet the requirements of special styling of the chair.

The seat assembly B comprises the usual bottom frame **4** joined at the front and rear with cross members such as **5** and adapted to support the conventional spring assembly concealed by the upholstery such as **6**.

The back C is similar in structure to the seat B and has the back board **7** joined at the top and bottom with cross boards such as **8** to form a box-like structure containing the mass of springs and padding common to this art.

The seat and back B and C are hinged together at their lower ends on each side by the hinges consisting of the straps **9**, **10** having their respective ends bent at oblique angles at **11**, **12** to form the extended brackets **13**, **14** attached to the boards **4** and **7** of the seat and back. The angular extensions of the straps **9**, **10** overlap and are pivoted together as at **15** on their respective sides of the seat and back. The front end of the seat is hinged at **16** to the front board **1** of the base. The seat and back thus hinged together form a toggle pivoted at **15** and adapted to swing as a unit on the pivot **16**.

The fulcrum arms such as **17** are supported on the pivots **18** fixed to the side boards **3**, **3'**, see Fig. 3. The upper ends of the swing arms are pivoted to the hinge straps **10** as at **19** to support the weight applied to the seat B. The lower ends of these fulcrum arms are offset as at **20** to form bracket stops for the lower ends of the seat boards such as **4** to stop the descent of the seat and stop the forward swing of the back C at the desired angle relative to the plane of the seat B and to relieve the weight on the hinge pivots as at **15**. The position of the rear surface and bottom edge of seat B is shown in broken lines in Fig. 1.

When the occupant of the seat B leans against the back C the pivots as at **15** act as fulcrums to lift the seat up as the back swings down. This causes the weight on the seat to determine the forward pressure of the back against the back of the occupant. The weight of the occupant is thus held in equilibrium on the pivots **19** at any posture he may choose.

The lower ends **21** of the fulcrum arms are attached to the ends **22'** of two side springs such as **22** that are anchored to the under side of the seat as at **23**. It is the function of these springs to restore the back C to the normal substantially vertical angle shown in Fig. 1. When the occupant leans back to the horizontal position shown in Fig. 2, the backward swing of the fulcrum arms **17** and the forward movement of the pivots **19** retracts the ends **20** and exerts an extra tension on the springs **22** to restore the back C to the normal position when the occupant leans forward. It is a demonstrated fact that a thirty-five pound child can lean backward against the back C and lift the seat B with the same relative results as a three-hundred pound occupant.

When not occupied the tension of the springs **22** pull the seat downwardly which acts through the arms **17** and the toggle hinge pintle **15** to maintain the back in the substantially vertical position shown in Fig. 1 with sufficient tension to prevent the back from wobbling back and forth when not in use.

Because of the swing arm pivots **18** the springs **22** are in effect interposed between the bottom of the seat and the stationary base and exert a downward pull against the seat as shown in Figures 1 and 2. Where space is available within the base, therefore, the lower end of the spring **22***x*, as shown in Figures 4 and 5, may be attached directly to the base forwardly of the pulley **24**.

For convenience in moving the chair about on the floor X the ornamental handles such as **23** are provided on the opposite sides of the back.

Without a combined base having side arms the present chair and base weight is about one-third as much as a similarly upholstered rigid arm chair.

In addition to the reclining comfort an armless chair such as described is more cheaply fabricated, knocked down, packed and shipped and reassembled. It may be sat in normally, sidewise or straddled backwardly and the hand or head rested upon the back for comfortably viewing television or games.

The structure and mode of operation is equally ap-

plicable to divans, convertible beds and the like, by adjusting the base pivot **18** to modify the action of the fulcrum arm **17**.

Where deep spring upholstery is used in the seat B, the available depth of space in the base A is insufficient for the length of the spring such as **22** to react to the swing of the back C relative to the seat. This is provided for by mounting the spring **22***x* as in Fig. 4, where the inner end **22'** is attached to the underside of the seat and the body of the spring is bent around the grooved pulleys such as **24** mounted on the adjacent sides, such as **3** of the base A, the outer ends of the springs being anchored to the base as at **23***x*.

The fulcrum arms **17***x* are pivoted at **18***x* to the sides **3**, **3'** of the base, permitting the fulcrums **19***x* to "float" forward and backward as the seat and back swing on the forward seat pivots at **16**. The seat and back are thus hinged together and act as a toggle in assuming the positions shown in Figs. 1, 2.

Where divans are adapted to function as flat beds, as in Fig. 5, it is desirable to lock the back C in the horizontal position shown in this figure. For that purpose the hinge strap **10** is modified as in Fig. 5 to locate the pivots **19***xx* directly beneath the hinge pintles **15**. The lower pivots **18***x* are replaced by two bolts such as **18***xx*, fixing the fulcrum arm preventing movement relative to the side boards **3**, **3'** of the base. This fixes the position of the fulcrum **19***xx*, against the floating action described and shown in Figs. 1, 2, 3, 4. With the fulcrum thus fixed the "floating" action is transferred to the seat B which must be free to slide forward and back relative to the fulcrums, by eliminating the front hinge **16**.

With the pivotal centers **15** and **19***xx* in vertical alinement, the action of the spring **22***x* is nullified and the seat and back are locked down in the horizontal position whether occupied or not. When the back C is raised to the substantially vertical position, such as is shown in Figure 1, the hinge pivot **15** moves forward and beyond the pivot **19***xx* and the seat B is subjected to the tension of spring **22***x*, being pulled downwardly so that it comes to rest substantially in the position shown in the broken dash line.

The fulcrum arm **17** is riveted to the back hinge plate **10** for convenience in assembling the hinge and installing it in the furniture.

The spiral form of spring shown is preferred, but other forms of springs such as torsion or leaf springs may be substituted.

In addition to the locked down divan back shown in Fig. 5 the same modified hinge may be applied to the single chair shown in Fig. 1.

Such single chairs fabricated in metal are especially adaptable to hygienic treatments. When the back stop E in Fig. 4 is omitted as in Fig. 5, the aligned seat and back may be tilted until the bottom face of the back member abuts the inner face of the seat as indicated from the horizontal position shown in Figure 5, the abutting seat B and back C may be pivoted on the pivot **19***xx* to the inclined position shown by the dot-dash broken line G, with the back inclined downwardly. In order to provide the space for this movement the member E is cut down in height as shown by E*x*, so that it is no longer capable of acting as a stop in the horizontal position. The sides **3** and **3'**, however, remain at the established height.

Freeing the front of the seat from the hinge at **16** permits the seat to be lifted up and makes the space within the base A available for the storage of bedding.

Having fully described this invention and its mode of operation what is claimed and desired to secure by Letters Patent is:

1. A reclining chair comprising a base open at the top, a seat and a back; a hinge joining said seat and said base along the front edges thereof to permit vertical movement of the rear portion of said seat within said base; a toggle hinge having a back plate and a seat plate pivoted together at one end and having lateral bracket portions at the other end attached to said seat and back respectively; a fulcrum arm pivoted at one end to said back plate to the rear of said toggle hinge pivot and intermediately of its length to a fixed pivot on said base substantially in vertical alignment with said hinge pivot; and a spring interposed between said seat and fulcrum arm for urging said seat downward within said base.

2. A reclining chair comprising a base open at the top; a seat and back; hinges joining said seat and back for pivotal movement adjacent the top portion of their meeting ends; a hinge joining said seat and said base along the front edges thereof to permit vertical movement of said seat within said base; a fulcrum arm pivoted at one end to said back and intermediately of its length to a fixed pivot on said base; and a spring interposed between said seat and the other end of said fulcrum arm for urging the rear portion of said seat downward within said base and said back forward on said joining hinges relative to said seat.

3. An automatically adjusting reclining chair comprising a base open at the top, a seat and a back; a hinge pivotally mounting said seat along the lower front edge thereof on said base to permit vertical movement of said seat within said base; hinges pivotally joining the meeting ends of said back and seat, the pivots of said last named hinges being located adjacent the top portions of said back and seat and spaced from the points of attachment thereof to said last named hinges; swing arms centrally mounted on fixed pivots on said base, the upper ends of which are fulcrumed to the said last named hinges rearwardly of said hinge pivots, and the lower ends of which are offset to limit counterclockwise movement of said seat and support the same in the rearwardly downwardly inclined position; and springs attached to said lower offset ends and said seat for urging said seat downwardly and said back forwardly into the upright position.

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