

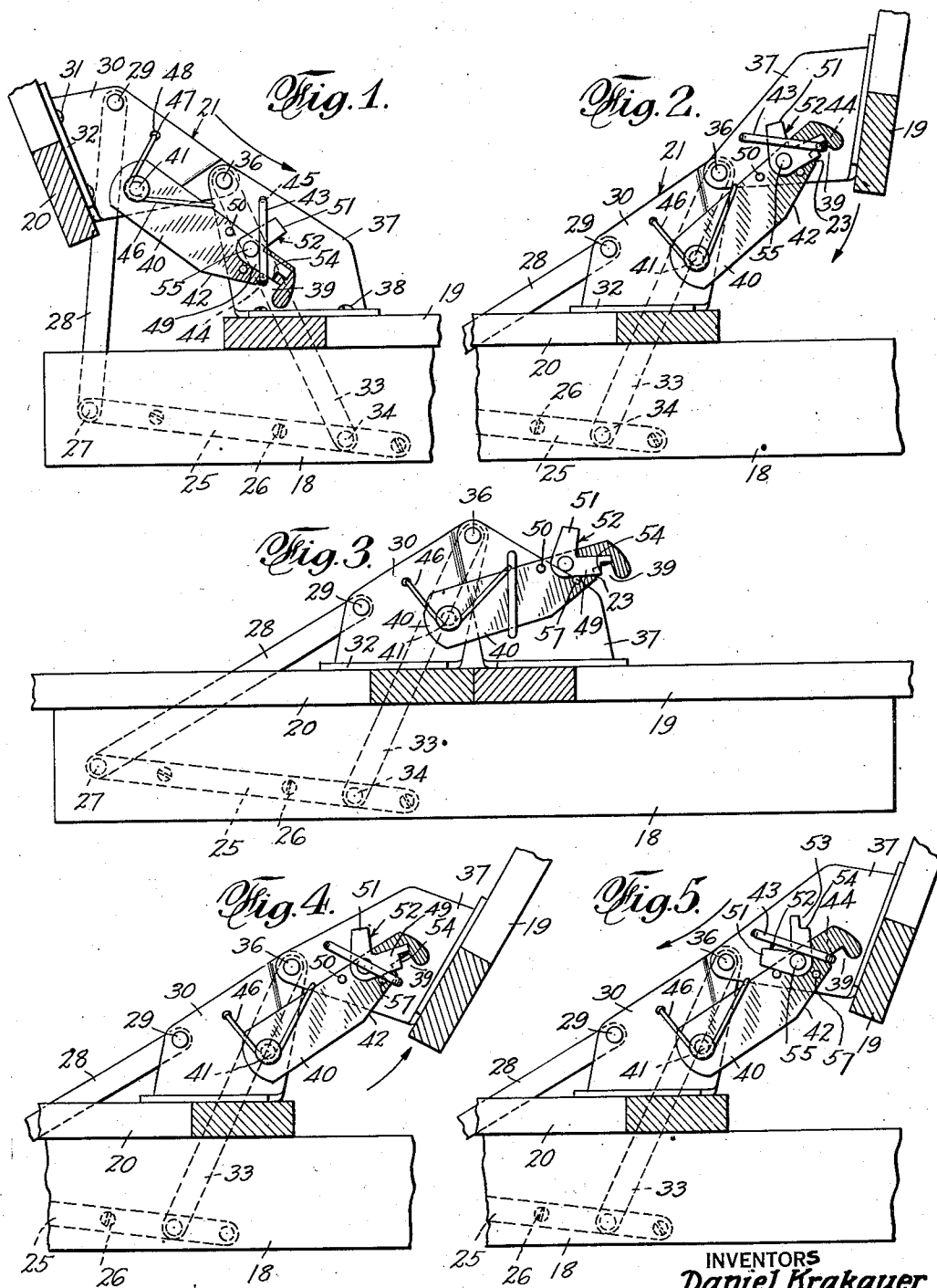
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COUCH HINGE

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COUCH HINGE

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This invention relates to sofa beds and particularly to the type wherein a seat section is hinged to the back section and both sections are movable into the bed-forming positions thereof, which positions are different from the sofa-forming positions.

The means heretofore used for connecting the back and the seat has been found objectionable to the extent that the user frequently does not know whether or not the seat has been locked to the back when moving the seat from its bed-forming position to its intermediate position in which position it is at substantially right angles to the back. Should the user lift the seat too far, the connecting means becomes unlocked though the user thinks it is locked, so that the seat owing to its weight, falls unexpectedly out of control back into the bed-forming position from which it has been lifted.

The present invention therefore contemplates the provision of a locking sofa bed which may be easily manipulated by unskilled persons without danger of the seat or back becoming accidentally unlocked and falling out of control.

The invention further contemplates the provision of a hinge which maintains the back and seat locked in their substantially perpendicular relative positions, said hinge being releasable after the parts have been moved from the sofa-forming position to the intermediate position as a unit and then being releasable only by a deliberate and intentional action of the user to permit the seat to be dropped into the bed-forming position.

The invention further contemplates the provision of a release trigger lever so mounted as to be inoperative to unlock the couch hinge parts except when the back is deliberately moved in a predetermined direction after it has first been swung into its intermediate position. That is, the trigger is operative to release the seat from the back only during movement of the seat from its intermediate position to the bed-forming position, the trigger also being unlocked while the seat is being moved from its bed-forming position to its intermediate position preparatory to the movement of the seat and back to their initial positions.

The various objects of the invention will be clear from the description which follows and from the drawing, in which,

Fig. 1 is a fragmentary side elevation partly in section of an end part of the sofa bed frame, the seat and the back, showing the parts, including

the hinge, in the sofa-forming position thereof.

Fig. 2 is a similar view of the same in the intermediate position and after the seat and back have been swung as a unit in the direction of the arrow of Fig. 1 out of the sofa-forming position and after the hinge has been unlocked by a slight rearward movement of the seat.

Fig. 3 is a similar view of the same showing the positions assumed by the parts when the seat has moved to the bed-forming position in the direction of the arrow of Fig. 2.

Fig. 4 is a similar view of the same showing the positions assumed by the parts during the movement of the seat in the direction of the arrow from the position of Fig. 3 to the intermediate position of Fig. 5.

Fig. 5 is a similar view of the same in the intermediate position assumed by the parts when the seat is moved in the direction of the arrow of Fig. 4 to the relatively locked positions of the seat and back, the trigger lever having been thrown to its inoperative position wherein it cannot function to unlock the parts, whereby the seat and back are locked and ready to be moved as a unit in the direction of the arrow of Fig. 5 back to their initial positions shown in Fig. 1.

In the practical embodiment of the invention shown by way of example, the back 20 is suitably hinged to seat 19 as by means of a pair of suitable hinges each arranged at one end of the back and each designated generally by the numeral 21.

The connecting hinge permits the movement of the seat and back together with the upholstery, springs, cushions or mattresses carried thereby into the various positions shown. In the position of Fig. 1, which is the normal or sofa-forming position of the parts, the back 20 is in its back-forming position and the seat 19 is in its seat-forming position. The back can be moved by lifting the front edge of the seat 19, whereupon the seat and the back may be swung as a unit into the intermediate position shown in Fig. 2 wherein the back is down in its horizontal or bed-forming position and the seat is in a raised or intermediate position preliminary to the swinging of the seat down into the bed-forming position thereof shown in Fig. 3.

In the intermediate position of Fig. 2, the seat is removably maintained in its raised position by the hinge 21. In the position of Fig. 3, the back and seat are in relatively coplanar positions so that the upper faces of the upholstery or mattresses thereon are at the same level and the sofa bed may conveniently be used as a bed.

The hinge controlling the above-described movement of the parts will now be described. Said hinge comprises the fixed member 25 shown in the form of a bar secured to the outer face of the carrier rail 18 by suitable means such as the screws or bolts 26. Pivoted to the fixed member or bar at one end as 27 is the link 28, the other end of which is pivoted as at 29 to the rear hinge member 30 which is secured to the back 20 by any suitable means such as the screws or bolts 31 passing through the flange 32 of said hinge member and into the back. A second link 33 is pivoted at its lower end as 34 to the fixed bar 25 and at its upper end is mounted on the hinge pin 36 which pivots the rear hinge member 30 to the front hinge member 37. Said front hinge member is secured to the seat 19 as by the screws or bolts 38 passing through a flange of the member and into the seat frame.

It will thus be seen that when the hinge members 30 and 37 are held against relative movement, the seat and back pivot on the links 28 and 33 and the bar 25. The seat and back may consequently be moved as a unit without changing the relative positions thereof. During such movement the links 28 and 33 swing about the pivots 27 and 34 at the lower ends thereof and about the pivots 29 and 36 at their upper ends. In other words, during the movement of the seat and back from the position of Fig. 1 to the position of Fig. 2, there is no relative movement of the hinge members 30 and 37 which swing as a unit, but there is relative movement of the links 28 and 33.

When the seat is moved into its bed-forming position (Fig. 3) from the position of Fig. 2, the hinge member 37 is unlocked from the hinge member 30, whereby it and the seat secured thereto move relatively to the hinge member 30 which does not change its position. Nor do the links 28 and 33 change their positions during the movement of the seat 19 from the position of Fig. 2 to that of Fig. 3. Means are therefore provided on the hinge, first to lock the back 20 and seat 19 together during movement of these parts from the position of Fig. 1 to that of Fig. 2 and second, to unlock or release the hinge members 30 and 37 from each other for relative movement from the position of Fig. 2 to that of Fig. 3, on proper manipulation.

Said means includes the main plate-like locking member 40 suitably pivoted near its left end on the pivot 41 carried by the hinge member 30. Said locking member 40 is provided with an inwardly and forwardly inclined lower edge 42 leading to the locking notch or recess 39 which is arranged near the free end of the main locking member. The free end or right-hand portion of said locking member passes through the space defined by the legs and cross bar of the U-shaped ball 43 which is secured to the hinge member 37 by means of its legs 44, 45. The locking member 40 moves back and forth through the ball 43 (Figs. 3 and 4) and swings on its pivot 41 between the legs of said ball when permitted to do so on the relative movement of the hinge members 30 and 37, or in other words, on the opening and closing of the hinge.

The weight of the locking member serves to urge the shoulder or edge 23 of the notch 39 therein into contact with the leg 44 of the ball 43 in the normal positions of the parts wherein the hinge members 30 and 37 are locked against relative movement.

To urge the member 40 in a clockwise direc-

tion about its pivot and thereby to maintain the edge 23 normally in contact with the ball leg 44 and also to resist movement of the member 40 in a counter-clockwise direction, the spring 46 is mounted on the pivot 41. One end 47 of the spring is bent and passed into the opening 48 in the hinge member 30, while the other end is bent over the upper edge of the locking member 40.

Carried by the free end portion of said member 40 in a position to guide the ball leg 44 out of the locking notch 39 at the proper time is the auxiliary release member or trigger lever 52. Said lever is provided with a corner notch 53 providing a shoulder 54, and is pivotally and loosely mounted on the main locking member 40 by means of the pivot pin 55. A stop pin 57 on the locking member 40 adjacent the arm 49 of the trigger lever serves to limit the extent of the swinging movement of said lever 52 about its pivot. A second stop 50 is arranged in the path of the arm 51 of said lever to limit the amount of counter-clockwise rotation of the lever. The arms 49 and 51 of the lever are at approximately right angles or at less than a right angle to each other to permit the lever to swing about its pivot by gravity when one arm is nearly vertical and the other is almost horizontal.

In the normal or sofa-forming position of the parts, as shown in Fig. 1, the back 20 is locked to the seat 19 in a position substantially perpendicular thereto. In this position, the leg 44 of the ball has entered the notch 39 and rests against the rear edge or shoulder 23 of said notch. The arm 49 of the release lever 52 also rests against the ball leg 44 owing to the lever having swung in a clockwise direction about its pivot 55 under the influence of gravity. The shoulder 54 of the pawl is to the right of the ball leg 44 and hence the parts are adequately locked together.

However, if the front edge of the seat 19 is raised, the ball leg 44 if not already in such contact may move slightly in the notch 39 into contact with the rear edge of the notch but no further, and the locking member 40 remains effective to hold the hinge members 30 and 37 against further relative movement. Continued movement of the seat in a counter-clockwise direction about the pivot 36 therefore causes the back 20 to move with the seat in a counter-clockwise direction into the position of Fig. 2 and until the seat is in the intermediate inclined position there shown. In said position, the hinge members 30 and 37 have not moved relatively to each other.

Now if it is desired to move the seat relatively to the back into the position of Fig. 3, the seat is again moved slightly rearwardly about the hinge pivot 36 sufficiently to release the locking member 40 (Fig. 2). On such movement, the ball 43 moves in the notch 39 of the locking member until the ball leg 44 is far enough to the right to pass the shoulder 54 and to reach a point opposite the notch 53 of the lever 52, permitting said lever to drop clockwise by gravity with its shoulder 54 in engagement with and to the left of the ball leg 44. On movement of the seat now in reverse or clockwise direction, said ball leg travels with the lever arm 49 in the notch 39 to a point outwardly beyond the line of the inclined edge 42 of the locking member 40, and is carried completely out of the notch and along the inclined edge 42 whereby the hinge member 37 is completely released from the hinge member 30 and swings relatively thereto, the locking

member at this time passing further through the ball 43 into the position of Fig. 3.

In reversing the movement of the parts to arrange the sofa bed from the position of Fig. 3 through that of Fig. 4 to that of Fig. 5, the seat is first lifted, swinging the hinge member 37 about the pivot 36 and carrying the bail leg 44 with a snap into the notch 39, owing to the pressure exerted by the spring 46 upon the member 40. The arm 49 of the release lever being in the path of the bail leg, said bail leg strikes said arm a sudden blow and swings the lever 52 in a counterclockwise direction about its pivot 55 to the position of Fig. 5 wherein the arm 51 thereof is against the stop 50.

The lever 52 remains in the position into which it has been thrown as above described under the influence of gravity acting on the arm 51 thereof, so that the seat is locked to the back and cannot be accidentally or even intentionally released from the back when the parts are in the position of Fig. 5. The parts being now in their relatively locked positions, dropping of the seat 19 swings the back 20 upwardly into the initial position of Fig. 1 while the seat 19 assumes its normal horizontal position.

As the seat and back are swung as a unit into the position of Fig. 1 from that of Fig. 5, the arm 51 of the lever 52 gradually approaches a vertical position while the arm 49 gradually approaches a horizontal position, while the lever remains fixed relatively to its pivot 55. As the position of Fig. 1 is approached, the lever 52 becomes overbalanced and swings in a clockwise direction under the influence of gravity to the position shown in Fig. 1 ready for the next releasing operation as previously described in connection with Fig. 2.

It will be seen that when the parts are moved from bed-forming to sofa-forming position, through the intermediate position, automatic unreleasable locking of the parts in the intermediate position is insured so that the seat cannot fall out of control should the operator accidentally attempt to move the seat too far.

It will therefore be seen that we have provided a comparatively simple structure well adapted to carry out the purposes of the invention and to meet the requirements of practical use.

While we have shown and described certain specific embodiments of our invention, we do not wish to be understood as limiting ourselves thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

We claim:

1. In a sofa bed having a seat and a back, a hinge having a pair of hinge members one adapted for connection to the seat and the other for connection to the back, whereby the seat and back are arranged for pivotal movement relatively to each other, and means for locking the hinge against such movement to permit the seat and back to be swung as a unit, said means comprising a spring-pressed notched locking member pivoted to one of the hinge members and a bail carried by the other hinge member and arranged to enter the notch to lock the hinge members together, and releasing means for the locking means comprising a lever pivoted to the locking member and having a pair of approximately perpendicular arms, one of the arms having a corner notch arranged to receive the bail and the other arm being adapted to overbalance the lever and thereby to swing said lever into its inopera-

tive position when the bail snaps into the notch of the locking member.

2. In a hinge for a sofa bed, a spring-pressed notched locking member, a bail arranged to enter the notch of the locking member to lock the hinge, and releasing means for the bail comprising a release lever pivoted to the locking member and having a pair of arms, one of said arms having a corner notch adapted to receive the bail in the operative releasing position of the lever, the other arm of said lever being an overbalancing arm swinging the lever to the inoperative position thereof when the bail strikes said one arm and snaps into the notch of the locking member.

3. In a locking and unlocking hinge for a sofa bed and having a pair of cooperating locking members, a spring pressing one of the members toward its locking position and unlocking means comprising a release lever pivoted to and carried by said one locking member and having a pair of diverging arms extending from the pivot point of the lever, one of the arms being arranged when the lever is in an unlocking position to be struck by the other locking member and overbalanced by the other arm as said other locking member is moved into its locking position.

4. In a locking hinge for a sofa bed, a pair of locking members carried by the hinge for relative movement into locking and unlocking positions on the movement of the hinge, and release means carried by one of the locking members and comprising a notched lever adapted to receive the other locking member in the release position of the lever, said lever having an overbalancing arm to swing the lever into its inoperative position when said other locking member moves into its locking position, and means on said one locking member to limit the movement of the lever in either direction.

5. In a locking hinge for a sofa bed, a first locking member, a release lever having a pair of approximately perpendicular arms joined at the adjacent ends of said arms, said lever being pivoted to the locking member at the joined ends of said arms and movable with said member, and movable also relatively to said member into a release position, and means for initiating the movement of said lever out of said release position comprising a second locking member cooperating with the first locking member to lock the hinge and arranged to strike one of the arms of the release lever when moved into locking engagement with said first member, and a pair of stops on the first locking member, one of the stops being arranged in the path of one arm and the other in the path of the other arm to limit the movement of the lever in either direction about its pivot.

6. In a sofa bed having a seat and a back, a hinge having a pair of hinge members respectively adapted for connection to the seat and the back, whereby the seat and back are arranged for pivotal movement relatively to each other, and means for locking the hinge against said movement to permit the seat and back to be swung as a unit into an initial position and an intermediate position at approximately 90° from the initial position, said means comprising a notched locking member pivoted on one of the hinge members and a bail carried by the other hinge member and arranged to enter the notch when the members are locked together, and releasing means for the locking means comprising a lever pivoted to the locking member and having a pair of arms, one of the arms having a corner notch

therein to receive the ball, and a stop carried by the locking member in the path of movement of the lever, said lever being overbalanced and swinging by gravity when the locked hinge is swung from said intermediate position into its initial position wherein the hinge member for the seat arranges the seat in its seat-forming position and the hinge member for the back arranges the back in its back-forming position.

7. In a hinge for a sofa bed, a notched locking member, a bail arranged to enter a notch of the locking member to lock the hinge, a release lever swingable toward and from a release position and pivoted to the locking member and having a pair of arms, one of the arms having a corner notch adapted to receive the bail in the operative releasing position of the lever, the other arm of said lever being an overbalancing arm swinging the lever by gravity on the manipulation of the hinge as a unit from one locked position of the hinge to another locked position through an angle of approximately 90°, said lever being swung again by said overbalancing arm toward a predetermined position when the hinge is moved from an unlocked position to a locked position.

8. In a hinge for a sofa bed, a pair of hinge members, a notched locking member pivoted to one of the hinge members, a bail carried by the other hinge member and arranged to enter the notch of the locking member to lock the hinge members together, and releasing means for the bail comprising a release lever pivoted to the locking member and having a pair of arms, one of the arms having a corner notch adapted to receive the bail in the operative releasing position of the lever, and a stop on the locking member in the path of an arm of the lever, said lever being overbalanced and swinging by gravity on the manipulation of the hinge into a predetermined initial locked position while said hinge is locked.

9. In a hinge for a sofa bed, a first notched locking member, a second locking member arranged to enter the notch of the first member to lock the members against relative movement, and a release lever swingable into a release position and pivoted to the first member at a point between the ends of the lever and notched to receive the second member, said lever having an overbalancing arm of substantial length on one side of the pivot, said arm being shaped to swing the lever by gravity about its pivot toward the release position thereof on the manipulation of the hinge as a unit from one locked position thereof to another locked position removed from said one position by an angle of approximately 90°.

10. In a locking hinge for a sofa bed, a pair of locking members carried by the hinge for relative

movement into locking and unlocking positions on the movement of the hinge, and release means carried by one of the locking members and comprising a notched lever adapted to receive the other locking member in the release position of the lever, said lever having an overbalancing arm to swing the lever when the hinge is moved while locked into a predetermined position, and means on said one locking member to limit the movement of the lever.

11. In a hinge for a sofa bed, a pair of hinge members, means for locking the hinge against relative movement of said members to permit the members to be swung as a unit into and out of a seat-forming position thereof, said means comprising a notched locking member and a bail arranged to enter the notch of the locking member, and releasing means for the bail comprising a release lever pivoted to the locking member and having a pair of arms, one of the arms having a corner notch adapted to receive the bail, the lever being overbalanced and swinging in one direction by gravity on the movement of the locked hinge members into the seat-forming position thereof, said lever being overbalanced to swing in the opposite direction when the hinge members are moved relatively to each other from an unlocked position thereof toward the locked position thereof.

12. In a hinge for a sofa bed, a pair of hinge members, a notched locking member pivoted to one of the hinge members, a second locking member carried by the other hinge member and arranged to enter the notch of the notched locking member to lock the hinge members together, and release means for the second locking member comprising a release lever pivoted to the notched locking member and having a pair of arms, one of the arms having a corner notch adapted to receive the second locking member in the operative release position of the lever, said lever being overbalanced and swinging by gravity toward said operative release position on the manipulation of the hinge into a predetermined initial locked position while said hinge is locked.

13. In a locking hinge for a sofa bed, a pair of locking members carried by the hinge for relative movement into locking and unlocking positions on the movement of the hinge, and release means carried by one of the locking members and comprising a notched lever adapted to receive the other locking member in the release position of the lever, said lever having an overbalancing arm to swing the lever toward said release position when the hinge is moved while locked into a predetermined position.

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