

Jan. 24, 1950

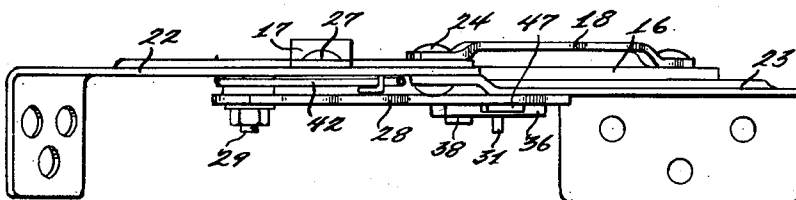
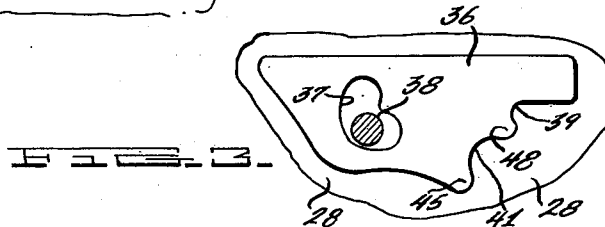
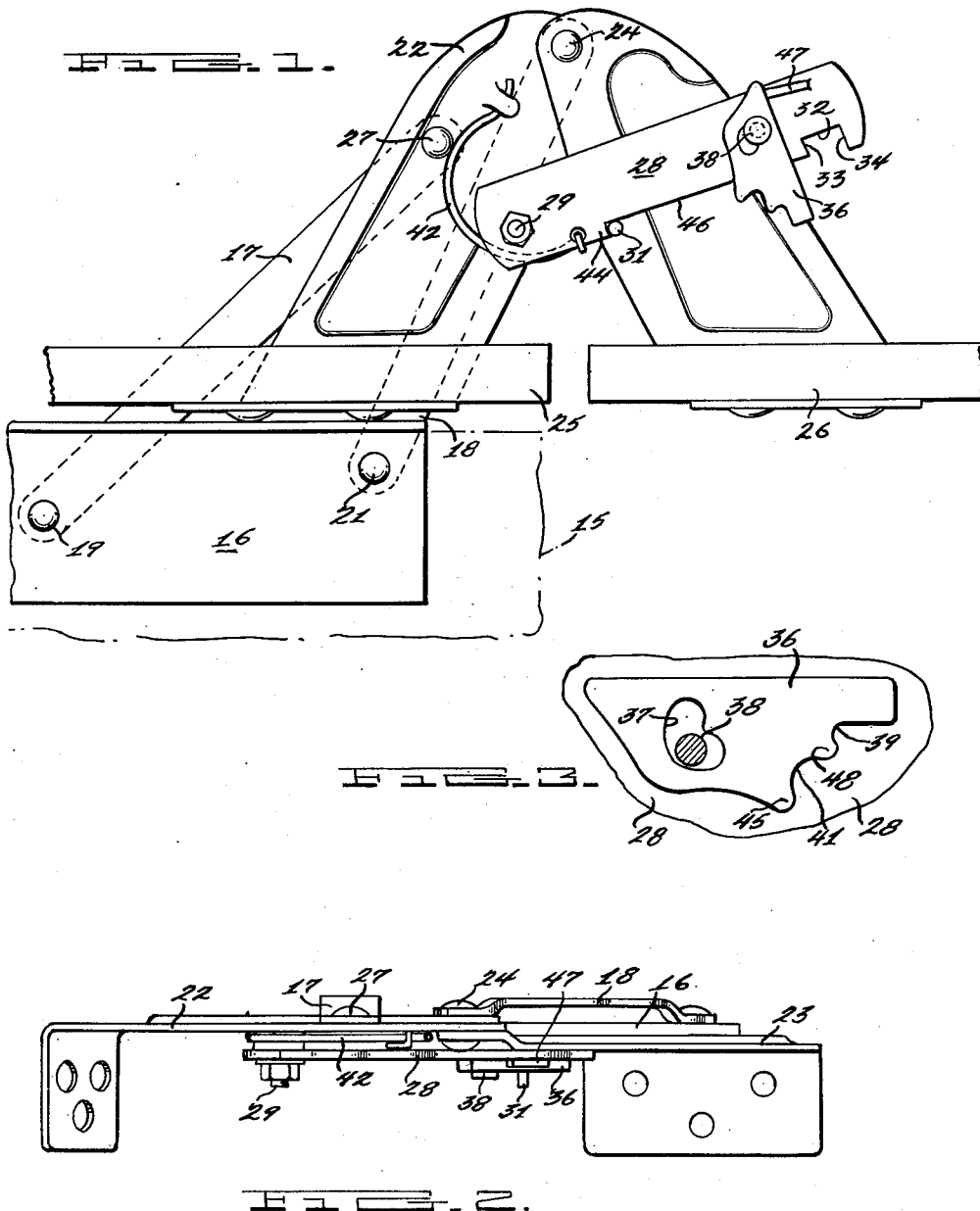
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2,495,413

SOFA BED HINGE

Filed Oct. 26, 1948

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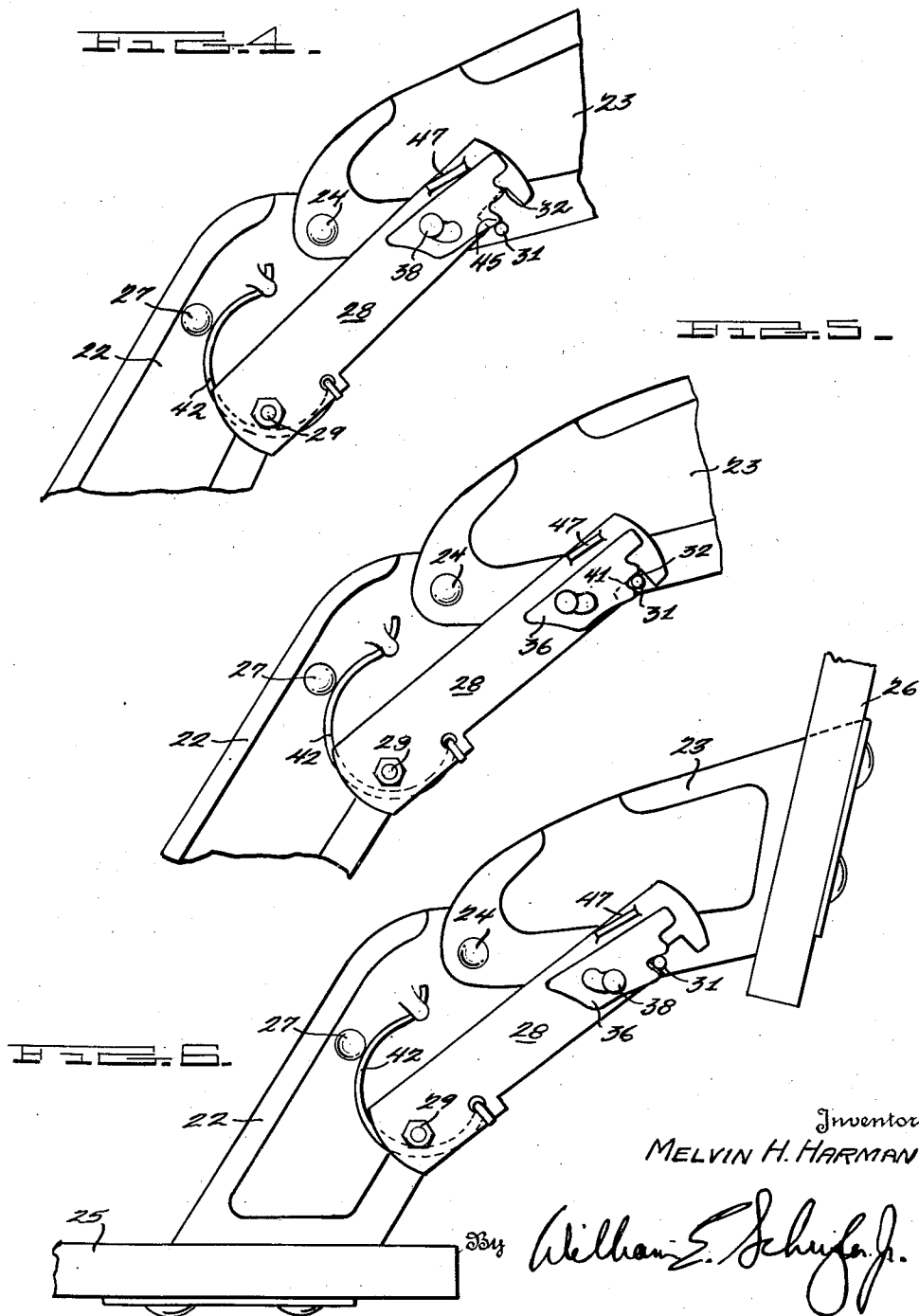
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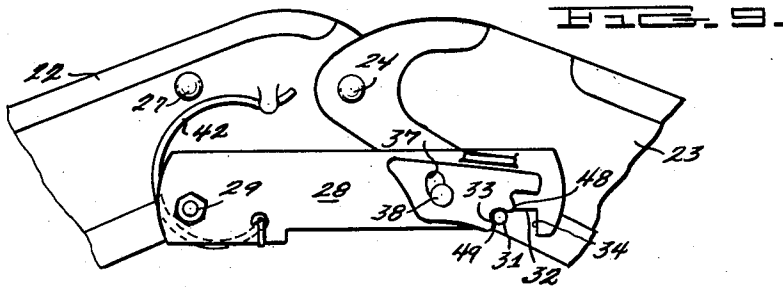


FIG. 8.

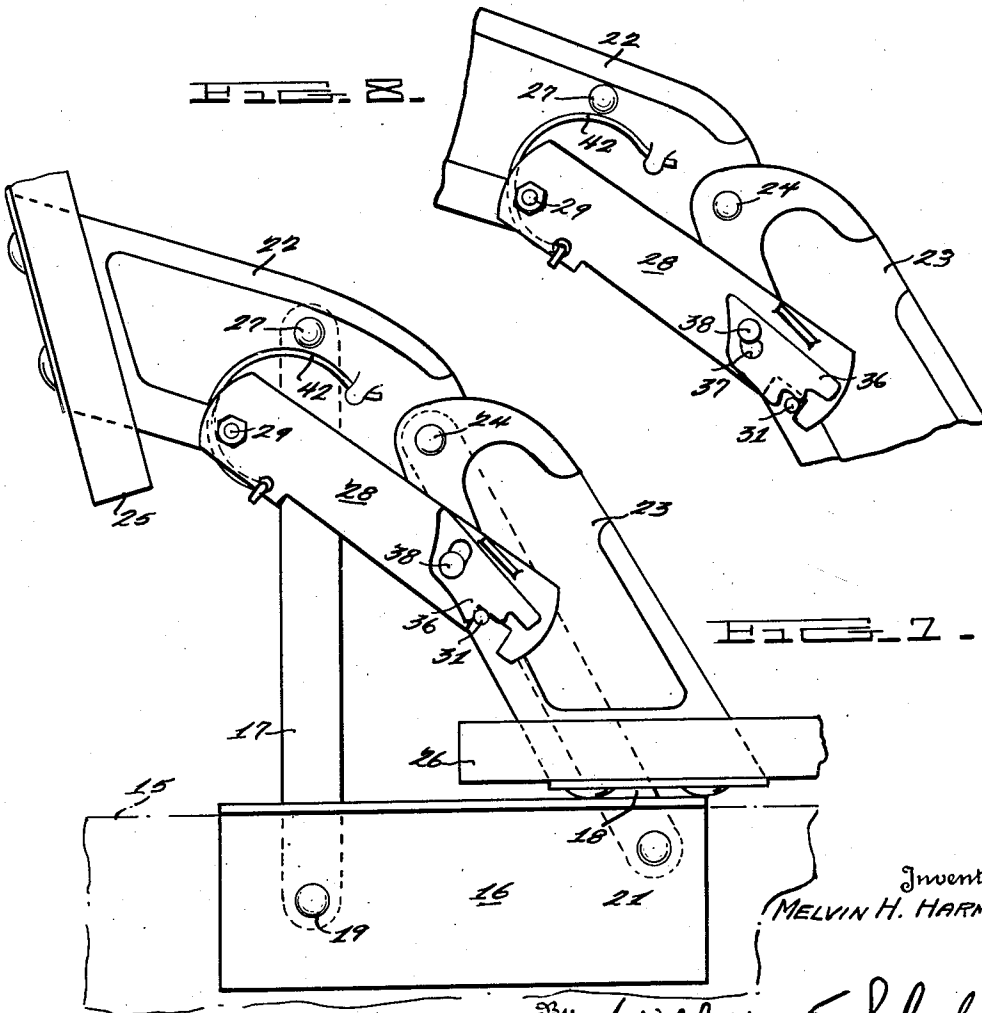


FIG. 7.

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FIG. 10.

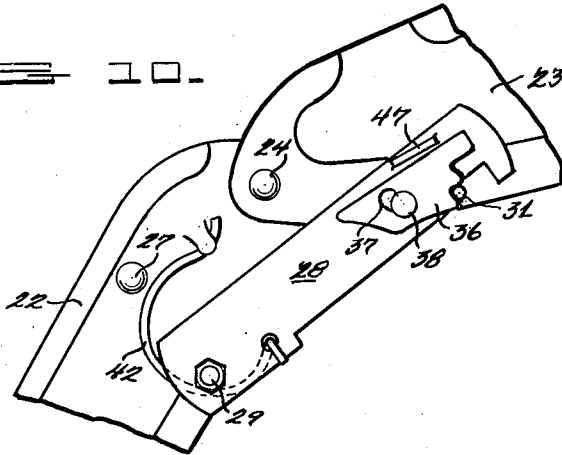


FIG. 12.

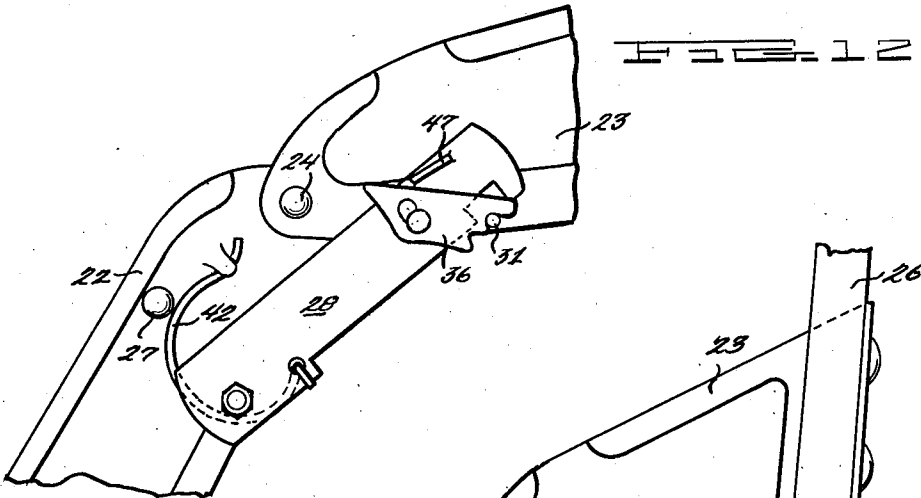
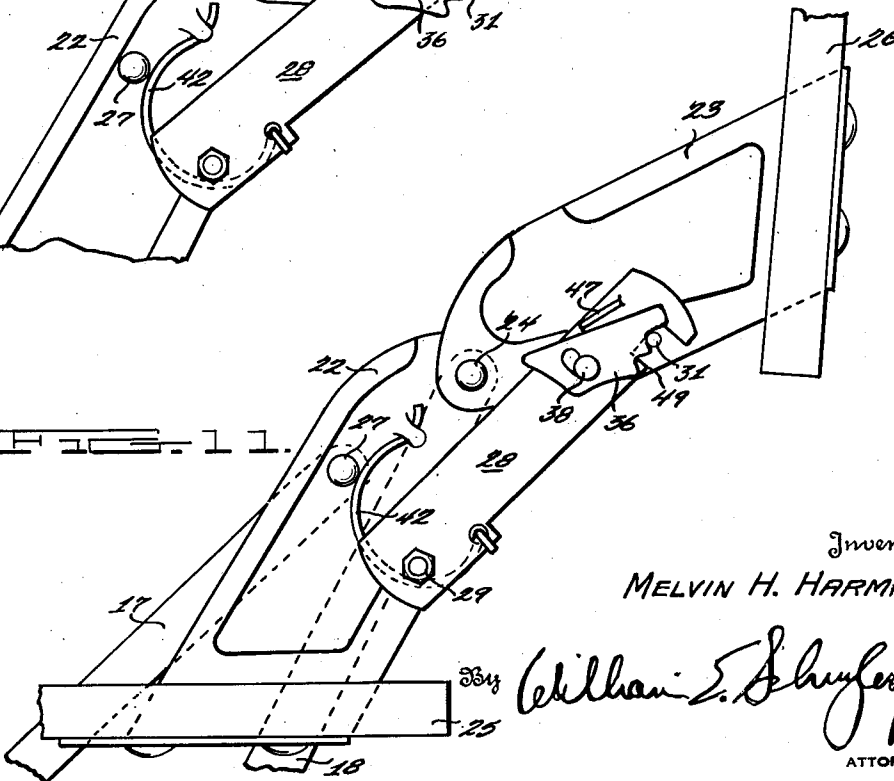


FIG. 11.



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SOFA BED HINGE

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6 Claims. (Cl. 5—47)

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This invention relates to sofa bed hinges and particularly to the type of sofa bed hinges which connect the seat and back frames of the sofa bed so they may be selectively moved to seat, intermediate and bed positions.

In sofa beds employing hinges of this type, it is frequently desirable to return the seat and back frames to a particular position from any other position without operating the sofa bed through a complete cycle. For example, with the seat and back frames in bed position, it usually is necessary to go through a complete cycle of moving the seat and back frames first to the intermediate position, then to sofa position, next returning to the intermediate position and finally returning to the bed position.

An object of the present invention is to enable an operator to move the seat frame from bed position to intermediate position and then return the seat frame to bed position without going through the remainder of the cycle.

In using hinges of this type on sofa beds, it is not unusual for the hinge latch to release when the seat and back frames are being moved from seat position to intermediate position. On those occasions when the hinge latch releases the back frame, due to its own weight, slides down onto the base of the sofa bed which results in undesirable noise and wear. It is, therefore, another object of this invention to provide a hinge latch which is locked during all movements of the seat and back frames between intermediate and bed positions and which may be unlocked to release the latch only upon manipulation of the seat frame when it is in its intermediate position.

In accordance with these objects major features of this invention reside in an improved hinge latch locking and releasing tumbler which is slidable both longitudinally and laterally and has double stepped shoulders at its free end, one shoulder for releasing the hinge latch and the other shoulder for locking the hinge latch to prevent release thereof.

Other objects and advantages of the invention will become apparent from the following specification taken in connection with the accompanying drawings wherein

Figure 1 is a partial sectional view of a sofa bed showing a sofa bed hinge embodying the invention in its preferred form;

Fig. 2 is a plan view of the sofa bed hinge shown in Fig. 1;

Fig. 3 is a partial sectional view of the hinge shown in Fig. 1 taken on an enlarged scale to

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illustrate the improved tumbler of the present invention; and

Figs. 4 to 12, inclusive, are diagrammatic views showing the arrangement and relative movements of the parts of the hinge at various positions in a cycle of operation.

Generally, the preferred form of the invention includes back and seat hinge plates for attachment to the back and seat frames of the sofa bed. The hinge plates are pivotally connected together and are also pivoted to a pair of links connected to the base of the bed in a well known manner for shifting the back and seat frames relative to the base when moving from sofa to intermediate and bed positions. One of the hinge plates has pivoted thereon a hinge latching arm, the free end of which has a notch for engaging an abutment on the other hinge plate to lock the hinge plates in fixed angular relation corresponding to the angular relation thereof when the back and seat frames are in sofa position. The notch is released from the abutment to permit angular movements of the hinge plates about their pivot for moving the back and seat frames to bed position. Release of this latching arm is accomplished by a tumbler having an arcuate slot whereby it is slidably mounted by a pivot pin on the latch arm. The arcuate slot permits both longitudinal and lateral movements of the tumbler. The free end of the tumbler has a latch releasing shoulder for contacting the abutment to disengage it from the notch in the latching arm. Stepped from the releasing shoulder toward the arcuate slot is a locking shoulder which is contacted by the abutment to slide the tumbler on the pivot pin and prevent engagement of the abutment with the release shoulder except upon relative angular movement of the back and seat frames when in their intermediate position.

As shown in the accompanying drawings, the sofa bed hinge is attached to a base 15 of a sofa bed by a supporting bracket 16. A pair of links 17 and 18 are pivotally connected, as at 19 and 21, to the bracket 16. These links 17 and 18 shiftably support a back hinge plate 22 and a seat hinge plate 23 which are pivotally connected together at 24, and may be attached to back frame 25 and seat frame 26, respectively, of the sofa bed. The link 17 is pivotally connected to one of the hinge plates, for example, back hinge plate 22 by a rivet, as indicated at 27. The other link 18 is connected at 24 to the pivotal connection for the hinge plates.

As shown in Fig. 1, the back and seat frames

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are both horizontally arranged and have been shifted forwardly of the base 15, to what is known as their bed position. From this position, the seat frame 26 may be moved relative to the back frame 25 about their common pivot 24. To control the amount of this movement and to secure the back and seat frames against relative angular movement about their pivot 24 in a fixed angular position corresponding to their sofa position, a hinge latching arm 28 is pivoted at one end, as at 29, to one of the hinge plates, in the example shown in the drawing, the back hinge plate 22. The other hinge plate, in this case, the seat hinge plate 23, is provided with an abutment, such as a pin 31, projecting from the seat hinge plate 23. Upon movement of the seat frame 26 about the pivot 24 in a counter-clockwise direction, as shown in Fig. 1, the abutment 31 will move into engagement with a notch 32 formed in the free end of the hinge latching arm 28. For reasons to be hereinafter explained, the notch 32 has its sides 33 and 34 spaced apart so the abutment 31 may slide therein.

Releasing and locking control of the hinge latching arm 28 is accomplished by a tumbler 36 shown most clearly in Fig. 3. This tumbler has formed therein an arcuate slot 37, of more or less L-shape, by which it is slidably mounted both transversely and longitudinally on a pivot pin 38 fixed to the hinge latching arm 28. The free end of the tumbler 36 has a double stepped formation to provide a releasing shoulder 39 and a locking shoulder 41.

To hold the hinge latching arm in engagement with the abutment 31, a suitable spring 42 is connected between the back hinge plate 22 and the hinge latching arm 28 in a manner such that the hinge latching arm is normally forced in a clockwise direction against the abutment 31. Clockwise movement of the seat hinge plate 23 and the seat frame 26 is arrested by engagement of the abutment 31 with a projection 44 on the lower side of the hinge latching arm 28. When the seat frame is moved counter-clockwise, the seat hinge plate 23 is also moved counter-clockwise from the position shown in Fig. 1 toward the position shown in Fig. 4. During this movement, the abutment 31 engages a lower projecting corner 45 of the tumbler 36 as the abutment slides along the lower side 46 of the latching arm. Continued counter-clockwise movement of the seat hinge plate 23 causes the abutment 31 to move the tumbler 36 counter-clockwise to the position shown in Fig. 4, where counter-clockwise movement of the tumbler 36 is arrested by engagement of its upper side with a stop 47 on the latching arm 28. In this position, the lower projecting corner 45 covers a part of the notch 32 adjacent the side 33 so continued movement of the seat hinge plate 23 causes the abutment 31 to reach a position opposite a central portion of the notch 32, where the spring 42 forces the latching arm 28 clockwise, so the notch 32 engages the abutment and the locking shoulder 41 of the tumbler rests on the abutment 31.

During this much of a cycle of operation, the tumbler 36 merely pivots about the pivot pin 28 so it remains with the pivot pin in the uppermost corner of its arcuate L-shaped slot where the locking shoulder 41 engages the abutment 31. Further counter-clockwise movement of the seat frame 26 and the seat hinge plate 23 is prevented, because the abutment 31 will engage the outer side 34 of the notch 32, as shown in

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Fig. 5. Then, the direction of movement of the seat frame is reversed and it is moved clockwise, preparatory to transferring the back and seat frames to their sofa position. Upon initial clockwise movement of the seat hinge plate 23, the abutment 31 slides from its position against the side 34 across the notch 32 until it engages the side 33. During this movement, from the position shown in Fig. 5 to the position shown in Fig. 6, the tumbler 36 is shifted both longitudinally and laterally until the pivot pin 38 is engaged in the lower and outermost end of the arcuate L-shaped slot. Then, upon further clockwise movement of the seat hinge plate 23, the force applied by the operator to the seat frame 26 is transmitted through the hinge latching arm 28 to the back hinge plate 22 of the back hinge plate and the back frame is moved in a clockwise direction and, at the same time, by the arrangement of the links 17 and 18, both hinge plates and their respective frames are shifted rearwardly of the sofa base 15 to the position shown in Fig. 7.

When it is desired to return the seat and back frames to their bed positions, the operator pulls the seat frame 26 outwardly to move it in a counter-clockwise direction. Initial movement of the seat frame 26, and the seat hinge plate 23, causes the abutment 31 to slide from its position, as shown in Fig. 7, across the notch 32 until it contacts the side 34, as shown in Fig. 8. During this sliding movement of the abutment 31 across the notch 32, the tumbler 36 slides longitudinally and laterally until the pivot pin 38 is engaged in the uppermost end of the arcuate L-shaped slot 37. Continued counter-clockwise movement of the seat frame causes both the seat and the back frames to turn and be shifted forwardly of the sofa base 15. As the link 17 is shifted from the vertical position shown in Fig. 7, the full weight of the back frame 25 is transmitted to the hinge latching arm 28 thereby again sliding the latching arm relatively to the abutment 31 until the abutment engages the inner side 33 of the notch 32, as shown in Fig. 9. At this time, the tumbler 36 again slides laterally and longitudinally until the pivot pin 38 engages the lower outermost end of the arcuate L-shaped slot 37.

It is at this point that the hinge latching arm of many hinges is automatically released by the weight of the back, and the back frame slams down against the base of the sofa bed. However, with the present invention, the notch in the hinge latching bar merely slides along the abutment but the engagement of the abutment 31 with the locking shoulder 41 of the tumbler slides the tumbler laterally and longitudinally and prevents the abutment from engaging the releasing shoulder 39. As the counter-clockwise movement of the seat frame is continued, the parts reach their intermediate position, as shown in Fig. 10, which is the same position previously described in connection with Fig. 6. At this point, the back frame is stopped from further movement by the sofa base 15. Continued counter-clockwise movement of the seat frame and the seat hinge plate again causes the abutment 31 to traverse notch 32 until it engages the outer side 34 thereof. As the distance from the outermost portion of slot 37 to shoulder 39 is greater than the distance from the pivot 38 to corner 49 of notch 32, continued clockwise movements of the abutment 31 and the tumbler 36 lifts the hinge latching arm 28, so it turns about its pivot 29 against the force of spring

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42 and the abutment 31 is removed from the notch 32. The abutment 31 then rides down the underside 46 of the hinge latching arm 28 until it engages the projection 44 where the seat frame is returned to its bed forming position.

As frequently happens, the operator may wish to move the seat frame from its bed position, as shown in Fig. 1, to its intermediate position, as shown in Fig. 6, and then return the seat frame to its bed forming position (Fig. 1) without going through the complete cycle. To accomplish this, after reaching the position shown in Fig. 6, instead of continuing clockwise movement of the seat and back frames toward the sofa position, the operator merely reverses the direction of movement so the seat frame is moved counter-clockwise. As previously mentioned, the parts are identically arranged, as shown in Figs. 6 and 10, whether they are moved to their intermediate position from the bed position, as shown in Fig. 1, or from the sofa position, as shown in Fig. 7. Thus, to return the seat frame from the intermediate position, shown in Fig. 6, to the bed position, it is necessary to move the seat frame counter-clockwise until the abutment 31 engages the outer side 34 of the notch 32 at which point the tumbler 36 drops so the release shoulder 39 engages the abutment 31. Then, clockwise movement of the seat frame will release the abutment 31 from the notch 32 and permit return of the seat frame to its bed forming position.

What is claimed is:

1. In a sofa bed hinge having pivotally connected back and seat hinge plates adjustable to seat, bed and intermediate positions and a latching arm pivoted to one of said plates formed with a notch to engage an abutment on the other of said plates to retain said plates in one position of adjustment about their pivot, latching arm control means comprising a pivot pin on said latching arm, a tumbler having an arcuately shaped slot formed therein supporting said tumbler on said pivot pin for longitudinal and lateral sliding movements as well as pivotal movements, and stepped releasing and locking shoulders at one end of said tumbler, said releasing shoulder being engageable by said abutment for releasing said abutment from said notch, said locking shoulder being engageable by said abutment to retain said releasing shoulder in inoperative position away from said abutment except upon pivotal movement of said plates when in said intermediate position.

2. In a sofa bed hinge having pivotally connected back and seat hinge plates adjustable to seat, bed and intermediate positions and a latching arm pivoted to one of said plates formed with a notch to engage an abutment on the other of said plates to retain said plates in one position of adjustment about their pivot, latching arm control means comprising a pivot pin on said latching arm, a tumbler having an arcuately shaped slot formed therein supporting said tumbler on said pivot pin for longitudinal and lateral sliding movements as well as pivotal movements, stepped releasing and locking shoulders at one end of said tumbler, said releasing shoulder being engageable by said abutment for releasing said abutment from said notch, said locking shoulder being engageable by said abutment to retain said releasing shoulder in inoperative position away from said abutment except upon pivotal movement of said plates when in said intermediate position, and a stop fixed to said latching arm for engaging

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said tumbler to limit pivotal movements thereof.

3. In a sofa bed hinge having pivotally connected back and seat hinge plates, adjustable to seat, bed and intermediate positions with a latching arm pivoted to one of said plates and formed with a notch for engaging an abutment on the other of said plates to retain said plates in one position of relative angular adjustment about their pivot, latching arm control means comprising a tumbler having an arcuate shaped slot formed therein, a pivot pin extending through said arcuate slot and fixed to said latching arm to support said latching arm for longitudinal and lateral sliding and pivotal movements, a releasing shoulder at the free end of said tumbler for contacting said abutment to disengage it from said notch, and a locking shoulder on said tumbler stepped from said releasing shoulder toward said slot for contacting said abutment to slide said tumbler on said pin and hold said releasing shoulder out of contact with said abutment except upon relative angular movement of said hinge plates when in said intermediate position.

4. In a sofa bed hinge having pivotally connected back and seat hinge plates, adjustable to seat, bed and intermediate positions with a latching arm pivoted to one of said plates and formed with a notch for engaging an abutment on the other of said plates to retain said plates in one position of relative angular adjustment about their pivot, latching arm control means comprising a tumbler having an arcuate shaped slot formed therein, a pivot pin extending through said arcuate slot and fixed to said latching arm to support said latching arm for longitudinal and lateral sliding and pivotal movements, a releasing shoulder at the free end of said tumbler for contacting said abutment to disengage it from said notch, a locking shoulder on said tumbler stepped from said releasing shoulder toward said slot for contacting said abutment to slide said tumbler on said pin and hold said releasing shoulder out of contact with said abutment except upon relative angular movement of said hinge plates when in said intermediate position, and a stop fixed to said latching arm for engaging said tumbler to limit pivotal movements thereof.

5. In a sofa bed hinge having pivotally connected back and seat hinge plates, adjustable to seat, bed and intermediate positions with a latching arm pivoted to one of said plates and formed with a notch for engaging an abutment on the other of said plates to retain said plates in one position of relative angular adjustment about their pivot said notch having its sides spaced to permit sliding movements of said abutment therein, latching arm control means comprising a tumbler having an arcuate shaped slot formed therein, a pivot pin extending through said arcuate slot and fixed to said latching arm to support said latching arm for longitudinal and lateral sliding and pivotal movements, a releasing shoulder at the free end of said tumbler for contacting said abutment to disengage it from said notch, and a locking shoulder on said tumbler stepped from said releasing shoulder toward said slot for contacting said abutment to slide said tumbler on said pin and hold said releasing shoulder out of contact with said abutment except upon relative angular movement of said hinge plates when in said intermediate position.

6. In a sofa bed hinge having pivotally con-

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nected back and seat hinge plates adjustable to seat, bed and intermediate positions with a latching arm pivoted to one of said plates formed with a notch for engaging an abutment on the other of said plates to retain said plates in one position of relative angular adjustment about their pivot, latching arm control means comprising a tumbler having an elongated slot formed therein, a pivot pin extending through said elongated slot and fixed to said latching arm to pivotally and slidably support said tumbler, a releasing shoulder at the free end of said tumbler for engaging said abutment and spaced from said slot a distance greater than the distance from said pivot pin to said notch, and a locking shoulder on said tumbler for contacting said abutment and spaced from said slot a distance less than the distance from said pivot pin to said

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notch whereby engagement of said abutment with said locking shoulder causes sliding movement of said slot along said pivot pin and engagement of said abutment with said releasing shoulder causes pivotal movement of said tumbler about said pivot pin.

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