

Feb. 10, 1953

J. LUND
BED-DIVAN HINGE

2,627,613

Filed Aug. 18, 1947

4 Sheets-Sheet 1

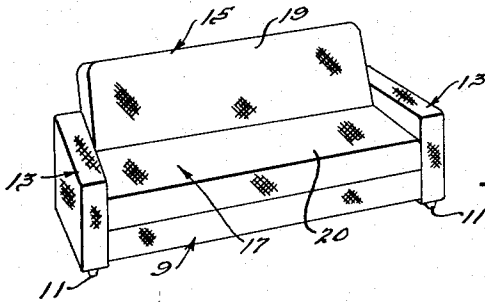


FIG. 1.

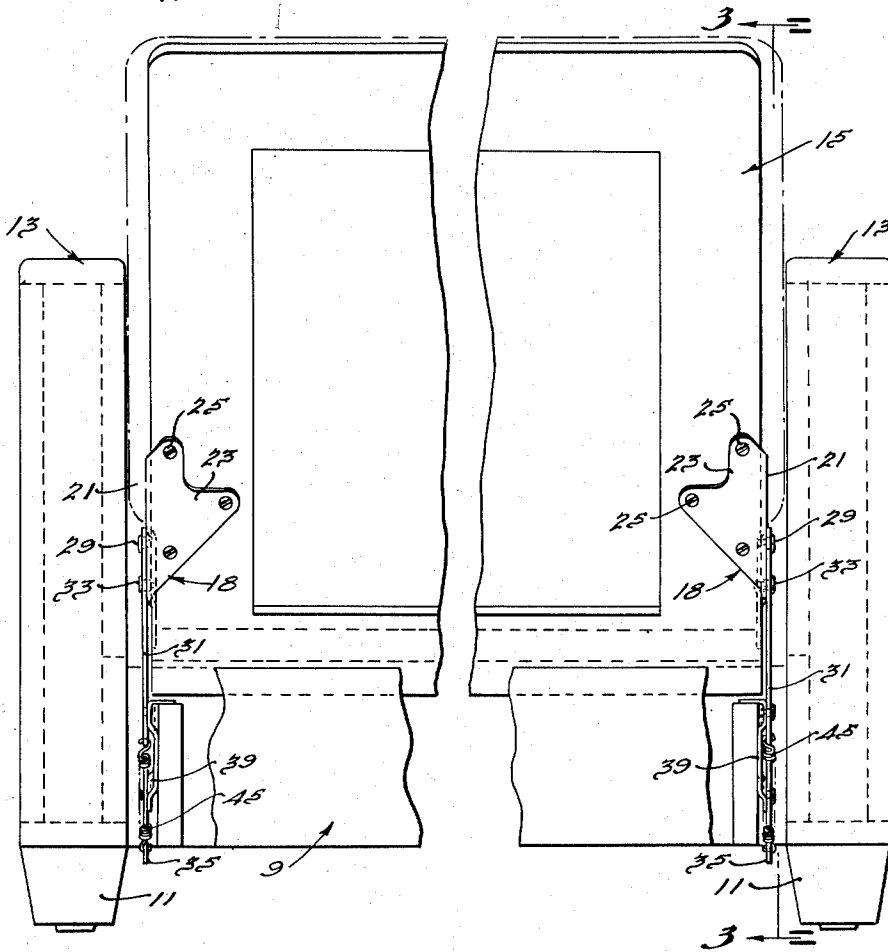


FIG. 2.

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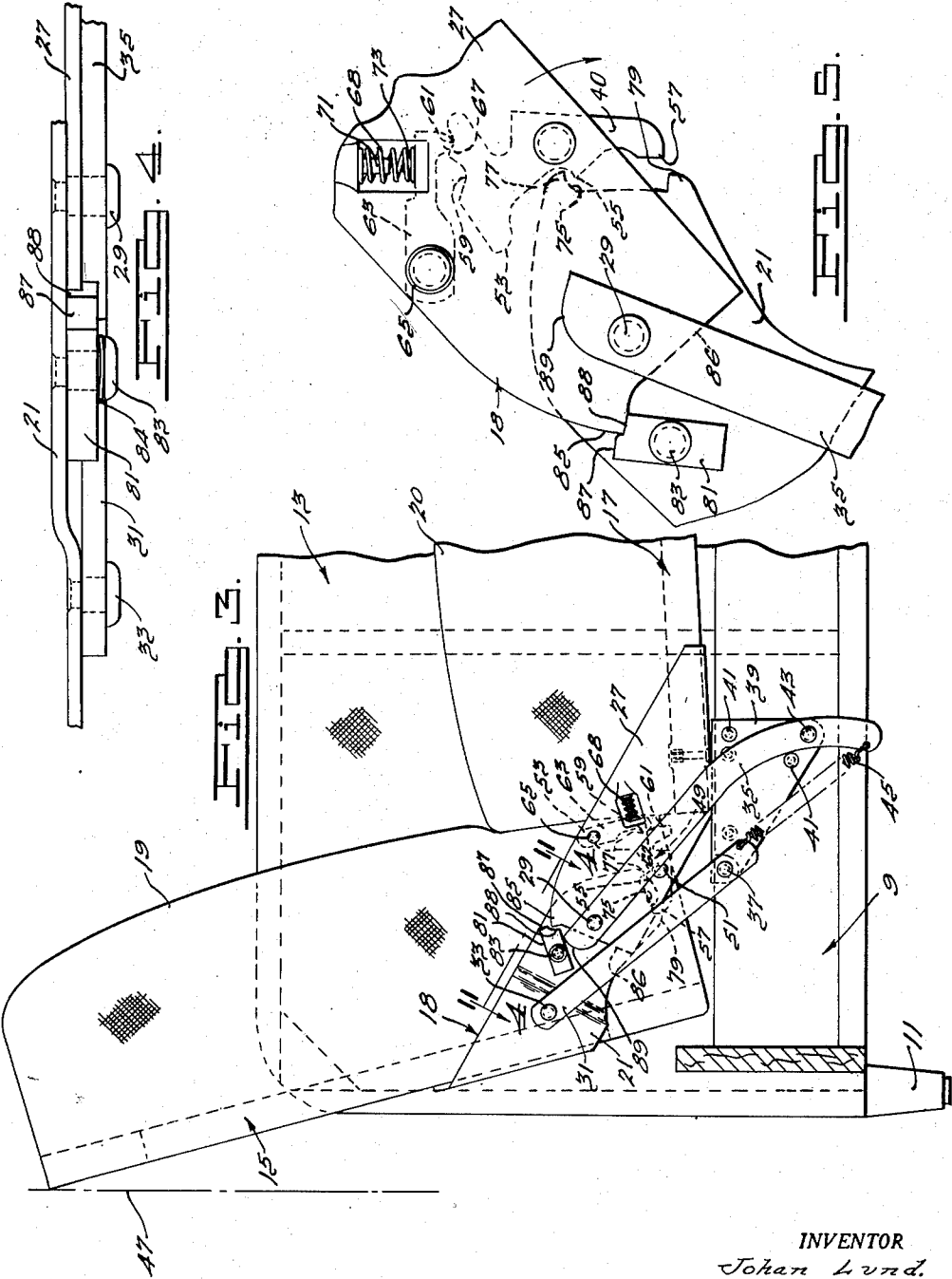
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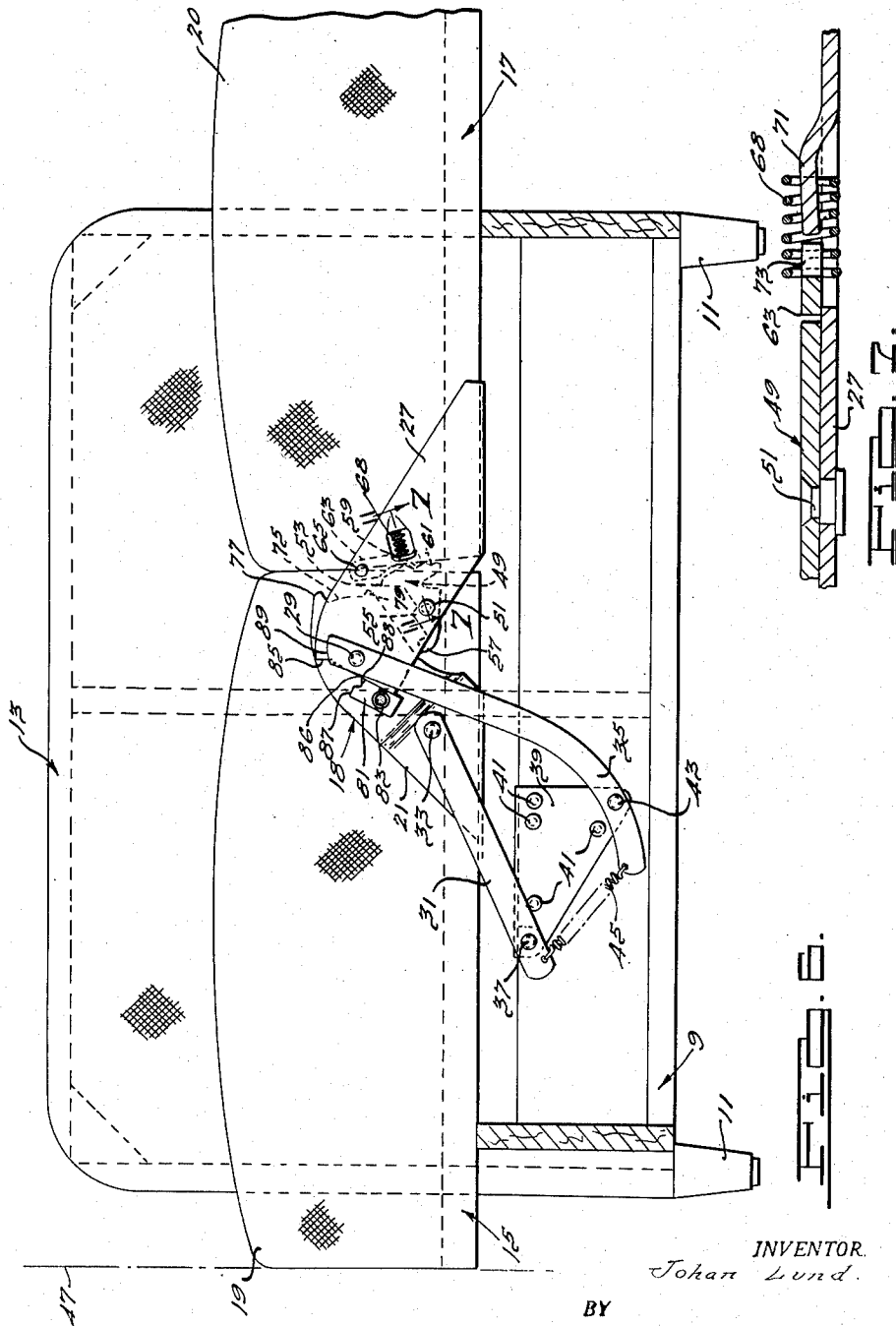
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4 Sheets-Sheet 4

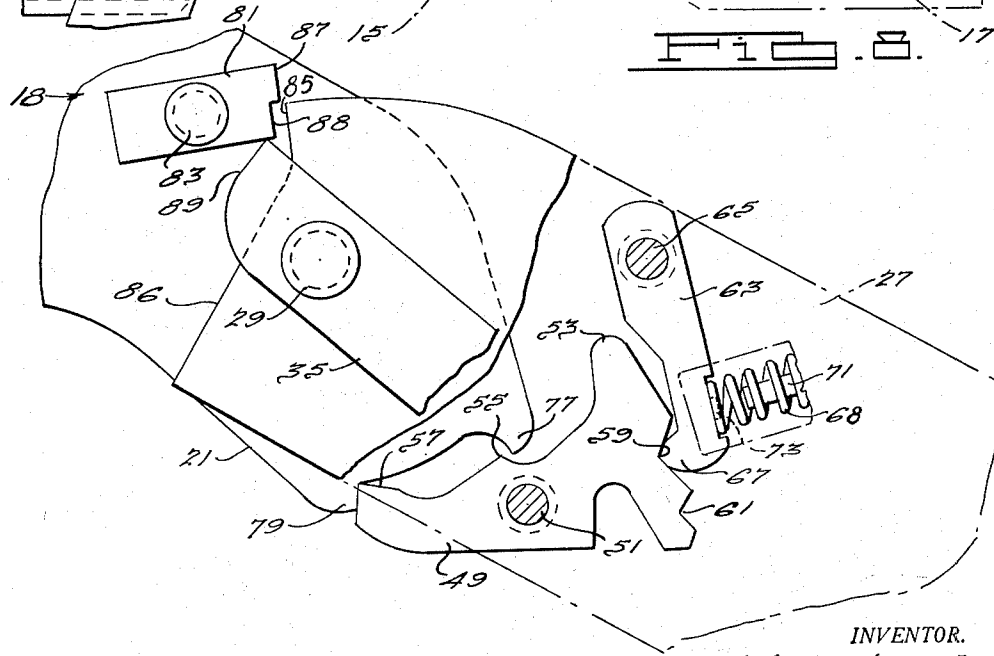
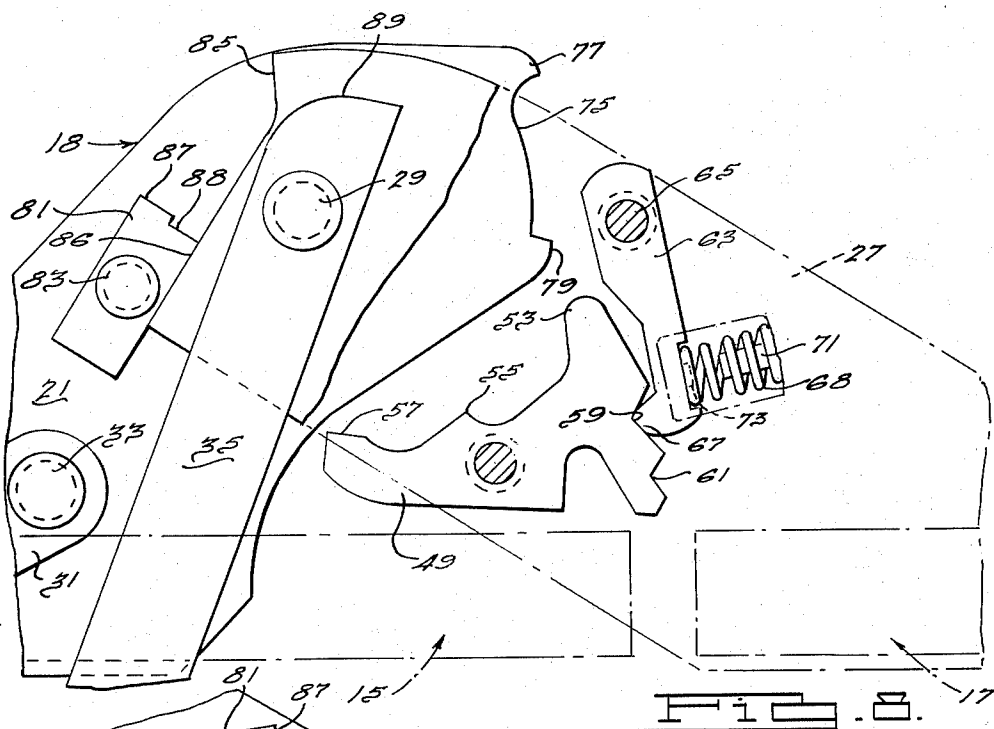


FIG. 9.

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BED-DIVAN HINGE

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10 Claims. (Cl. 5-47)

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This invention relates generally to convertible furniture and more particularly to an improved hinge structure for connecting two upholstered frame sections of a bed divan at right angles, to form a seat, and in aligned horizontal relationship, to form a bed.

Conventional bed divans are not entirely satisfactory because when the divan is arranged for use as a seat, the lower edge of the back frame section is disposed above the adjacent edge of the seat frame section. This causes a visible crack or recess between the adjacent edges of two upholstered sections and makes the bed divan unattractive in appearance, and uncomfortable to use. Also, most bed divans now in use must be moved away from an adjacent wall in order to be converted into a bed, because when the back frame section is lowered to the bed position, it swings rearwardly beyond its upstanding position.

Accordingly, the principal objects of this invention are to provide an improved hinge structure for connecting the upholstered sections of a bed divan so that the adjacent edges of the sections are close together when they are in alignment to form a bed and are moved one behind and below the other when moved to form a seat; to provide an improved hinge structure of the aforementioned type so arranged and constructed that the bed divan can be placed close to a wall and need not be moved away from the wall in order to be converted from a seat to a bed; to provide an improved bed-divan hinge of the aforementioned type having cooperating latch means and cam surfaces for latching the hinged frame sections when they are disposed at right angles with respect to each other so as to form a seat and which permit the sections to be easily unlatched so that they may be swung into an aligned horizontal relationship to form a bed; to provide stop means for preventing movement of the hinged frame sections beyond the latched position while in one position, and to permit further movement of the hinged frame sections so as to unlatch the same in another position; to provide in general a hinge structure for connecting two upholstered sections of a bed divan which will permit the construction of an attractive bed divan which may be easily converted to either a seat or bed.

These and other objects of this invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a bed divan arranged to form a seat;

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Fig. 2 is an enlarged broken rear elevational view of the structure illustrated in Fig. 1;

Fig. 3 is a fragmentary view, partially in section and partially in elevation, of the structure illustrated in Fig. 2 taken along the line 3-3 thereof;

Fig. 4 is an enlarged elevational view of the structure illustrated in Fig. 3 taken along the line 4-4 thereof;

Fig. 5 is a fragmentary view similar to Fig. 3 illustrating the parts rotated 90° and the hinge unlatched;

Fig. 6 is a view similar to Fig. 3 with the bed divan arranged to form a bed;

Fig. 7 is an enlarged sectional view of the structure illustrated in Fig. 6 taken along the line 7-7 thereof.

Fig. 8 is a view of structure, similar to that illustrated in Fig. 5, with the frames disposed in bed position, and

Fig. 9 is a view of structure, similar to that illustrated in Fig. 8, with the frames disposed in seating position.

Referring now to the drawings, it will be seen that the bed divan includes a stationary base frame 9 which is supported at its opposite ends by legs 11 and which has upstanding upholstered end frames forming arm rests 13. Hingedly supported on the base frame 9 are two frame sections 15 and 17 having upholstered spring structures 19 and 20 respectively thereon. When the bed divan is arranged to form a seat, as illustrated in Fig. 1, the frame section 15 and its upholstered structure 19 serves as the back of the seat, and the frame 17 and its upholstered structure 20 serves as the bed-divan seat. The frame sections 15 and 17 are hingedly connected adjacent their opposite ends, to each other and to the base frame 9, by means of a hinge structure generally indicated at 18. The hinge structure 18 at each end of the frame sections is identical in construction, except that one is of a right-hand construction and the other is of a left-hand construction. Therefore, the hinge structure on only one end of the frame sections will be described in detail, it being understood that like part numbers apply to similar parts throughout.

A platelike supporting member 21 is disposed adjacent the end of the back frame section 15 and has an inwardly bent flange portion 23 which is secured to the back face of the frame section 15 by screws 25. A platelike supporting member 27 is disposed adjacent the end of the seat frame section 17 and has an inwardly bent flange portion on the underside thereof which is likewise secured by screws to the underside of the frame

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section 17. The free ends of the supporting members 21 and 27 overlap and are pivotally connected at 29. A supporting arm 31 is pivotally connected at 33 to the supporting member 21 and extends angularly downwardly therefrom. A second supporting arm 35 is pivotally connected to the supporting members 21 and 27 at the pivot 29. The lower end of the supporting arm 31 is pivotally connected at 37 to a supporting plate 39 which in turn is fixed to the base frame 9 by means of screws 41. The lower end of the supporting arm 35 is pivotally connected at 43 to the supporting plate 39. A coil spring 45 has its opposite ends connected to the lower ends of the arms 31 and 35 for a reason which will hereinafter appear. The supporting arms 31 and 35 pivotally support the members 21 and 27 on the base frame 9 and are so arranged as to swing about their pivots 37 and 43 respectively in a parallelogramlike manner.

Due to this arrangement of the arms, when the frame sections 15 and 17 are moved relative to the base frame section 9, to convert the bed divan from a seat to a bed, or vice versa, the upper rear edge of the frame section 15 will not move rearwardly of the line 47 illustrated in dot and dash in Fig. 3. This arrangement permits the lower edge of the frame section 15 to be disposed behind and below the upholstered structure 20 of the frame section 17, while forming a seat, and permits the frame sections 15 and 17 to be swung relative to the base section 9 without necessitating, for example, moving the bed divan away from an adjacent wall.

A latch member 49 is pivotally connected to the supporting member 27, at 51, and is provided on the edge thereof adjacent the supporting member 21 with spaced cam surfaces 53 and 55, and a projecting latch portion 57. The forward edge of the latch 49, disposed substantially at right angles to the edge adjacent the supporting member 21, is provided with a pair of longitudinally spaced notches 59 and 61. A finger 63 is pivotally connected to the supporting member 27, at 65, adjacent to the latch 49 and has a nose 67 on its free end which is adapted to be received in either of the notches 59 or 61. The finger 63 is held in engagement with one or the other latch notches 59 or 61 by means of a coil spring 68. As can be seen in Fig. 7, one end of the spring 68 is carried by a tab 71 lanced from the supporting member 27, and the other end is inserted over a projecting tab 73 on the finger 63 so as to maintain the spring in contact with the finger 63. The spring 68 urges the finger 63 towards the latch 49 so as to hold the nose portion 67 in engagement with one or the other of the latch notches 59 or 61, for a reason which will hereinafter appear.

The front edge of the supporting member 21 is notched or cut back at 75 to provide a cam 77 at one end thereof which is adapted to engage and co-operate with the cam surfaces 53 and 55 on the latch 49 so as to rotate the latch in either a clockwise or counterclockwise direction as will be hereinafter brought out. The notch 75 provides, adjacent the opposite end thereof, a latching detent 79 which is adapted to engage the projecting latch portion 57 of the latch member 49 to latch the supporting members 27 and 21 together as will be described below. When the bed divan is arranged to form a seat, as illustrated in Figs. 3 and 9, the projecting latch portion 57 is disposed within the supporting member notch 75 and abuts the latching detent 79 so as to latch the supporting members 21 and 27 together. The

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nose 67 on the finger 63 is engaged in the latch member notch 59 and thereby maintains the latch member 49 against movement relative to the supporting member 21 to thereby retain the supporting members 21 and 27 in latched relation while the frame sections 15 and 17 are so disposed at right angles.

Pivotally mounted on the supporting member 21, adjacent the free end of the supporting member 27, is a stop plate 81 which is held on the plate 21 by means of a rivet 83. As can be seen in Fig. 4, a spring washer 84 is disposed between the head of the rivet and the face of the stop plate 81 so as to frictionally retain the stop plate in any rotated position as will be hereinafter brought out. The adjacent edge of the supporting member 27 is formed with a substantially flat cam surface 86 which is adapted to abut the stop plate 81 and rotate it in a clockwise direction, for a reason which will hereinafter appear. One end of the cam surface 86 is formed with a projecting nose or abutment surface 85. The upper edge 87 of the stop plate 81 has its corner, adjacent the projecting nose 85, cut back at 88 so that the nose 85 on the end of the supporting member 27 is adapted to abut either the stop plate upper edge 87 or the cut-back portion 88, depending upon the position of the stop plate. The upper end of the supporting arm 35 is formed with an arcuate cam surface 89 which is adapted to abut the stop plate 81 and rotate it in a counterclockwise direction, as will be brought out.

In operation, when it is desired to convert the bed divan from a seat, as shown in Figs. 3 and 9, to a bed, as shown in Figs. 6 and 8, the forward edge of the seat frame section 17 is pulled outwardly and upwardly. The pulling of the frame section 17 in this manner causes the supporting arms 31 and 35 to swing about their pivots 37 and 43, respectively, in a clockwise direction. The spring 45, which interconnects the ends of the arms, is already elongated under tension when the structure forms the seat and so, during the first 45° of the outward and upward movement of the frame section 17, expends energy to aid in the lifting of the frame section 17. As the frame section 17 is moved upwardly and the arms move in a clockwise direction, the back frame sections 15 will be moved downwardly and forwardly with the upper rear edge thereof never moving rearwardly of the line 47. When the frame section 17 has reached a vertical position and the back frame section 15 is in a horizontal position so as to be fully supported on the base frame section 9, the frame section 17 is moved additionally in the same direction until the nose or projecting abutment surface 85 on the end of the supporting member 27 strikes the cut-back portion 88 on the upper edge 87 of the stop plate 81. This additional movement of the frame section 17 causes the cam 77 on the front edge of the frame-supporting member 21 to abut the cam 55 on the latch member 49 and rotate the latch in a counterclockwise direction. The rotation of the latch member 49 will move the notch 59 away from the nose of the finger 63, and the notch 61 will be engaged thereby so as to retain the latch in the position illustrated in Fig. 5. The rotation of the latch member 49 likewise disengages the projecting latch portion 57 from the latch detent 79 on the supporting member 21. Therefore, the hinge members 21 and 27 are unlatched and the frame section 17 may be pulled downwardly to rest on and be fully supported on the base frame 9 in a horizontal position and thereby form a bed.

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When the frame section 17 is pulled downwardly, the cam surface 86 on the free end of the supporting member 27 abuts the stop plate 81 and causes it to rotate in a clockwise direction to the position illustrated in Fig. 6 so that the cut-back portion 88 on the upper edge thereof is moved away from the nose or projecting abutment surface 85 on the end of the supporting member 27, and the upper edge 87 of the stop plate is moved into position to engage the nose 85 upon the next upward movement of the frame section 17.

The downward movement of the frame section 17 also causes the cam surface 77 on the end of the supporting member 21 to strike the cam surface 53 on the latch member 49 and rotate the latch member 49 in a clockwise direction so as to re-engage the finger 63 with the notch 59. However, as the projecting latching portion 57 of the latch member 49 is spaced from the detent 79 of the supporting member 21, the supporting members are still unlatched.

When it is desired to reconvert the bed divan from a bed to a seat, the frame section 17 is lifted upwardly, causing the projecting latch portion 57 on the end of the latch member 49 to ride along the outer surface of the member 21 and the detent 79 until the frame sections 17 and 15 are disposed at right angles. When the members are disposed in this relationship, the latch portion 57 on the latch member 49 passes over the end of the detent 79 into the notch 75. The supporting members 21 and 27 are then latched together. As the stop plate 81 has been rotated in a clockwise direction, the nose 85 on the supporting member 27 will abut the stop plate upper edge 87 above the cut-out portion 83, and will prevent the member 27 from being inadvertently moved therebeyond so as to unlatch the supporting members, as previously described. When the latching operation has been completed, the frame section 17 is then pulled downwardly and the spring 45, connecting the ends of the supporting arms 35 and 31, will be elongated and thus will retard the downward movement of the frame section 17, so as to prevent the latter from falling against the base frame 9. The downward movement of the frame section 17 also causes the cam surface 89, on the upper end of the supporting arm 35, to strike the stop plate 81 and rotate it in a clockwise direction so as to return it to the position illustrated in Fig. 3, whereby the nose 85 on the member 27 will again strike the cut-back portion 88 when the bed divan is converted into a bed.

It will thus be seen that a hinge construction is provided on each end of the frame sections 15 and 17 which will permit the bed divan to be easily converted to either a seat or a bed, as well as permitting the bottom edge of the seat frame 15 to be disposed below the upper upholstered structure 20 of the seat frame 17. The hinges thus permit the construction of a neat, attractive bed divan which may be attractively styled for use in any room as both a divan and a bed.

I claim:

1. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, means on said other member cooperating with said latch means for latching said two members together when in one position, cam means on said other member and said latch means for positively rotating said latch means both clockwise and counterclockwise into and out of latching position, and spring means for securing

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said latch means in either said clockwise or counterclockwise rotated position.

2. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, means on said other member cooperating with said latch means for latching said two members together when in one position, cam means on said other member and said latch means for rotating said latch means clockwise and counterclockwise into and out of latched position, spring means for securing said latch means in either said clockwise or counterclockwise rotated position, and stop means on the other of said members for limiting the movement of the member having said latch means thereon for permitting relative movement of said members into latched position and preventing movement therebeyond.

3. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, means on said other member cooperating with said latch means for latching said two members together when in one position, cam means on said other member and said latch means for rotating said latch means clockwise and counterclockwise into and out of latched position, spring means for securing said latch means in either said clockwise or counterclockwise rotated position, pivoted stop means on the other of said members for limiting when in one position the movement of the member having said latch means thereon for permitting relative movement of said members into latched position and preventing movement therebeyond to unlatching position, and means supporting said pivoted members for movement as a unit having cam means thereon for rotating said stop means out of stopped position so as to permit said member to be moved beyond its latched position for moving said latch means to said unlatched position.

4. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, means on said other member cooperating with said latch means for latching said two members together when in one position, cam means on said other member and said latch means for rotating said latch means clockwise and counterclockwise into and out of latched position, spring means for securing said latch means in either said clockwise or counterclockwise rotated position, pivoted stop means on the other of said members for limiting when in one position the movement of the member having said latch means thereon for permitting relative movement of said members into latched position and preventing movement therebeyond to unlatching position, means supporting said pivoted members for movement as a unit having cam means thereon for rotating said stop means out of stopped position so as to permit said member to be moved beyond its latched position for moving said latch means to said unlatched position, and means on the supporting member having said latch means mounted thereon for engaging said stop means and moving the latter into stopped position.

5. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said

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members, said latch means having two cam surfaces and a latching surface, one of said cam surfaces being adapted for use in rotating said latch means in a clockwise direction and the other for rotating said latch means in a counterclockwise direction, means on said other member engageable with said latch means cam surfaces for operating said latch means so as to latch and unlatch said members, and spring means for retaining said latch means in said clockwise and counterclockwise advanced positions.

6. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, said latch means having two cam surfaces and a latching surface, one of said cam surfaces being adapted for use in rotating said latch means in a clockwise direction and the other for rotating said latch means in a counterclockwise direction, means on said other member engageable with said latch means cam surfaces for operating said latch means so as to latch and unlatch said members, spring means for retaining said latch means in said clockwise and counterclockwise advance positions, and stop means carried by said other member for limiting the movement of said members relative to each other when moved into said latched position.

7. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, said latch means having two cam surfaces and a latching surface, one of said cam surfaces being adapted for use in rotating said latch means in a clockwise direction to latching position and the other for rotating said latch means in a counterclockwise direction to unlatching position, means on said other member engageable with said latch means cam surfaces for operating said latch means so as to latch and unlatch said members, spring means for retaining said latch means in said clockwise and counterclockwise advance positions, movable stop means carried by said other member disposed in one position for limiting the movement of said members at which point they may be latched and additional means carried by said members for moving said stop means to a second position to permit said members to be moved beyond said point to release said latch.

8. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, latch means pivotally mounted on one of said members, means on the other of said members for moving said latch means into and out of latching position, movable stop means carried by said other member which when in one position prevents the two members from being moved relative to each other beyond a position at which

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they may be latched, and means for moving said stop means to a second position for permitting movement of said members beyond said one position to release said latch.

9. A hinge for a bed divan having two frame sections, including a supporting member for each section, means pivotally connecting said members, a latching element pivotally mounted on one of said members, means on the other of said members engageable by said latching element for latching the members together, cam means on said other member for moving said latching element into and out of latching position, movable stop means carried by said other member which when in a first position limits the pivotal movement of said one member on said other member to latching position and in a second position permits the pivotal movement of said one member on said other member beyond said latching position to unlatching position, and means supporting said members as a unit, said supporting means moving said stop means to said first and second positions.

10. A hinge for a bed divan having two frame sections, including a supporting member for each section, a pivot connecting said members, arms pivotally connected to said members, a supporting plate pivotally connected to the opposite ends of said arms, latching means pivotally mounted on one of said members, means on the other of said members engageable by said latching means for latching said members together, cam means on said other member for moving said latching means into and out of latching position, a movable stop means carried by said other member which when in a first position limits the pivotal movement of said one member on said other member to latching position and in a second position permits the pivotal movement of said one member on said other member beyond said latching position to unlatching position, one of said arms and members being so shaped and located as to move said stop means to and from said first and second positions, and spring means connected to at least one of said arms for applying force thereto during movement in one direction and to be tensioned when moved in the opposite direction.

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