March 23, 1954 D. D. RHODES ET AL 2,672,625

COMBINATION FURNITURE AND HINGE THEREFOR

Filed Feb. 6, 1951 2 Sheets-Sheet 1

FIG. 1.

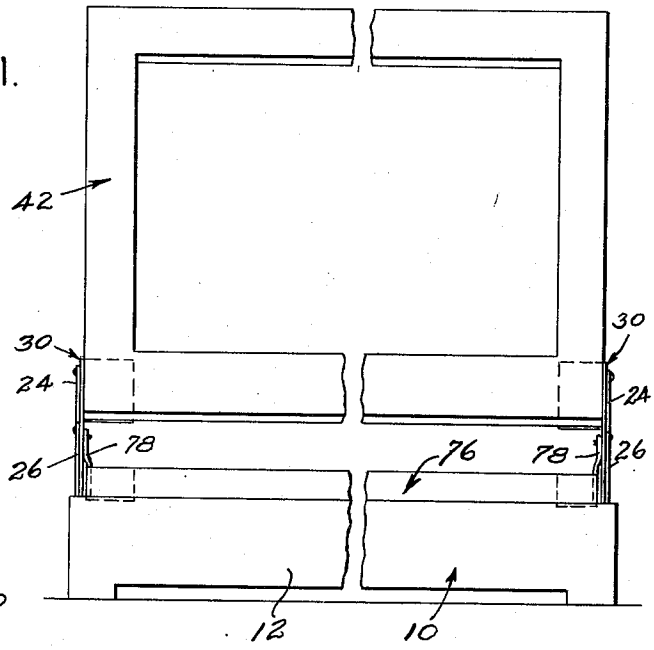


FIG. 2.

FIG. 3.

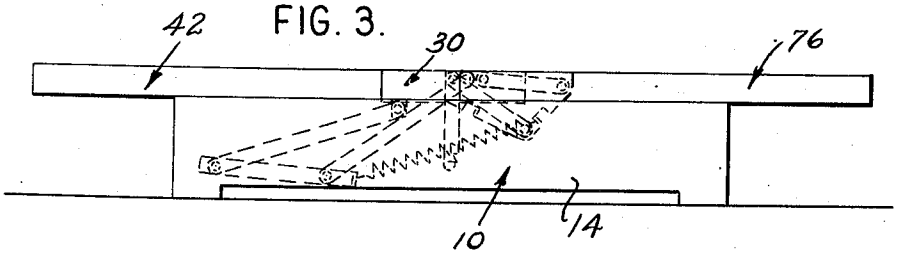
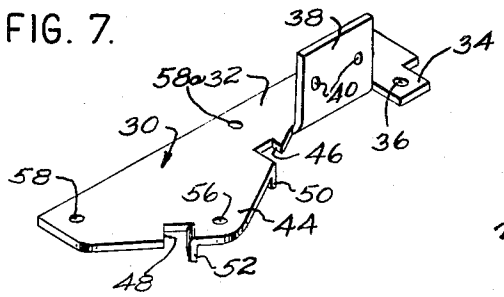


FIG. 7.



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FIG. 4.

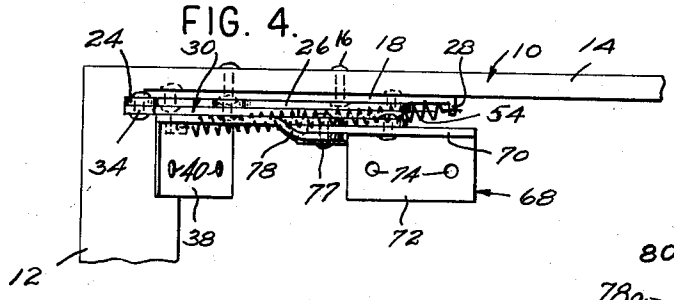


FIG. 9.

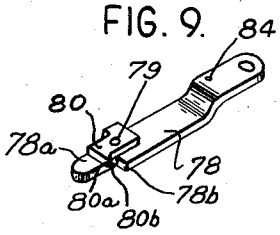


FIG. 5.

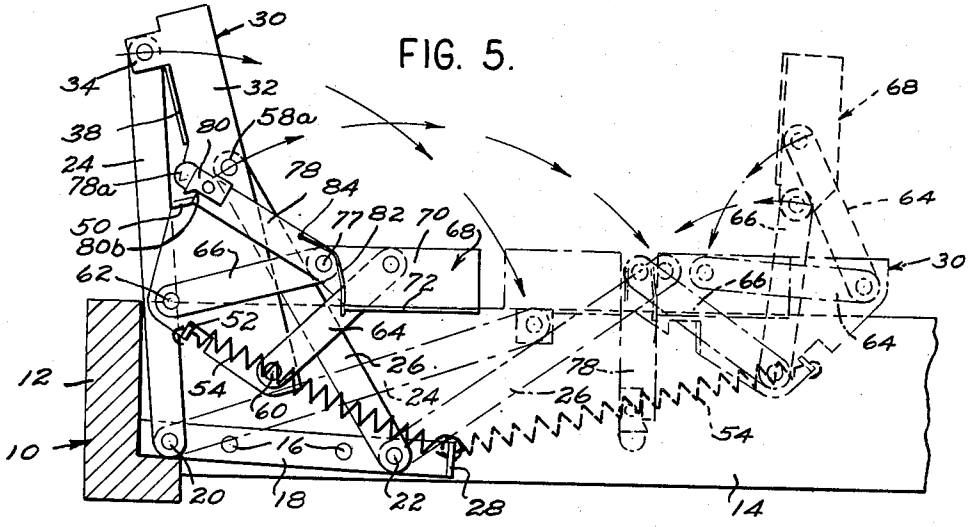


FIG. 6.

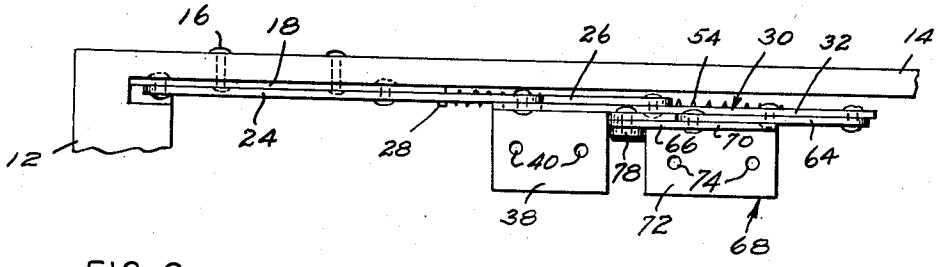
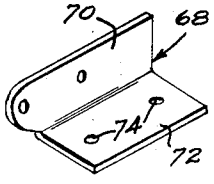


FIG. 8.



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COMBINATION FURNITURE AND HINGE THEREFOR

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Application February 6, 1951, Serial No. 209,637

14 Claims. (Cl. 5—47)

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This invention relates to combination furniture and a hinge for such furniture and has for its primary object to enable the back of an article of furniture, such as a divan, to be lowered into a horizontal position and to enable the seat of the divan to be moved transversely and in parallel relation to the back so that when the article of furniture is so extended a bed or couch will result.

Another object is to prevent injury to the occupant of the divan or couch through contact with the hinges by which the seat and back are connected to one another.

A further object is to so locate the hinges as to avoid any interference thereof with the upholstery and avoid the production of hard or lumpy spots in the article of furniture when it is used either as a divan or as a couch.

A still further object is to keep all portions of the hinges by which the seat and back are connected, below the spring and upholstery structure of the device so as to avoid the protrusion of any portion of a hinge into the upholstery or spring structure.

The above and other objects may be attained by employing this invention which embodies among its features an elongated base frame, elongated links pivotally carried at spaced points by each end of said base frame adjacent one longitudinal side edge thereof, said links being movable in vertical intersecting arcuate paths which lie transversely of the base frame adjacent to opposite ends thereof, a plate carried by each pair of links and movable from a substantially vertical position adjacent the aforesaid side edge of the base frame to a horizontal position intermediate the side edges of the base frame, a back frame carried by the plates and extending therebetween for movement therewith, and a seat frame carried by said plates for movement therewith from a substantially horizontal position adjacent the aforesaid side edge of the base frame to a horizontal position overlying and extending beyond the opposite side edge of the base frame.

Other features include disposing the upper ends of the links below the upper sides of the back and seat frames when the latter are in couch forming position so as to avoid any protrusion of the links into the upholstery or spring structure of the back and seat when the latter are in couch forming position.

Still other features include a pair of elongate links pivotally mounted in spaced relation to move in intersecting arcuate paths, a plate pivotally carried by the links for movement in arcuate paths from a substantially vertical position to a substantially horizontal position, means carried by the plate for supporting a back frame thereon, a pair of elongate links, pivotally connected at spaced points to the plate for movement in intersecting arcuate paths, and a seat frame carrier pivotally connected to the last named links for movement from a position substantially perpendicular to the plate to a position adjacent to and parallel with said plate.

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In the drawings:

Figure 1 is a front view of a base frame, and seat and back frames of an article of combination furniture showing the parts in a position to form a sofa or divan;

Figure 2 is an end view of the article of furniture illustrated in Figure 1;

Figure 3 is an end view illustrating the relative position of the parts when the article of furniture has been converted into a couch or bed;

Figure 4 is an enlarged plan view of one corner of the article of furniture illustrating the hinge in a position to hold the back substantially vertical;

Figure 5 is a side view of the structure illustrated in Figure 4 and showing in dot and dash lines the relative position of the parts when the article of furniture has been extended to form a couch;

Figure 6 is a plan view of Figure 5 showing the relative position of the hinge parts when they have been extended to form a couch;

Figure 7 is a perspective view of the back carrying plate;

Figure 8 is a perspective view of the seat carrier; and

Figure 9 is a perspective view of the latch bar.

Referring to the drawings in detail a base frame designated generally 10 comprises, spaced parallel side bars 12 joined at opposite ends by spaced parallel end bars 14 to form an elongate rectangular base frame.

Secured as by rivets or bolts 16 to the inner faces of opposite end bars 14 are base bars 18 to which are pivotally connected as at 20 and 22 respectively, elongate links 24 and 26. Formed on the end of the base bar 18 remote from an adjacent side rail 12 is an angularly extending apertured ear 28 for a purpose to be more fully hereinafter described. As illustrated in the drawings the base bars 18 are secured to the opposite end bars or rails 14 adjacent the rear side rail or bar 12 of the frame and the links 24 and 26 move in vertically disposed arcuate paths

about their respective pivots 20 and 22 as suggested by the arrows in Figure 5. It is to be noted that the arcuate paths in which the links 24 and 26 move intersect one another.

A plate designated generally 30 comprises an elongate body 32 carrying adjacent one end a rearwardly extending (when the plate is upright) ear 34 through which an opening 36 extends. Carried by the body 32 adjacent the ear 34 and extending perpendicularly thereto is a flange 38 having spaced openings therein for the reception of fastening devices by means of which the back frame 42 of the article of furniture is secured to the plate 30. The elongate body 32 is provided, on the edge carrying the ear 34 and flange 38, with a substantially triangular rearward extension 44 which is notched as at 46 and 48 to provide perpendicularly extending lugs 50 and 52 respectively. The lug 52 is apertured for the reception of one hooked end of a retractile coil spring 54, the opposite end of which is anchored in the aperture of the lug 28 on the base bar 18. Formed in the triangular extension 44 adjacent the apex thereof is a pivot receiving opening 56, and adjacent to the front edge of the body 32 is a pivot receiving opening 58 adjacent to the end of the body remote from the ear 34 and a pivot receiving opening 58a formed approximately midway between the ends of the body.

Extending through the openings 56 and 58 are rivets or pivot pins 60 and 62 respectively by means of which elongate links 64 and 66 are each pivotally connected at one end to the plate 30. Pivotally connected to the other ends of the links 64 and 66, as hereinafter set forth, is a seat frame carrier designated generally 68 which comprises an elongate flat body 70 disposed in a vertical plane and having formed along one longitudinal edge a perpendicularly disposed horizontal flange 72 having spaced openings 74 therein for the reception of fastening devices by means of which the seat frame 76 is connected to the seat frame carriers 68 of the hinges at opposite ends of the base frame 10.

Pivotally connected at one end to the pivot 77, by means of which the link 66 is pivotally coupled to the seat frame carrier 68 is a latch arm 78. The opposite end of this arm is of reduced width forming a longitudinally extending finger 78a and the shoulder 78b. Pivoted in the side of the arm 78, at 79, at the other end of the finger, is a latch release member 80 which has a portion overlying the adjacent end of the finger 78a. The corner of the release member 80 nearest to the shoulder 78b is extended laterally to form a bill 80a which coacts with the adjacent shoulder to form a notch 80b in which is received the lug 50. A torsion spring 82 is anchored at one end in an opening 84 in the latch arm 78 and the opposite end of said torsion spring is anchored to the edge of the flange 72 of the seat frame carrier 68 adjacent the pivot 77. It will thus be seen that as said latch arm 78 is moved across the lug 50 the spring causes the latch arm 78 to press against said lug 50 while said arm is in locking position and while said arm is being released by the latch release member.

In use with the hinge members connected to opposite end bars 14 of the base frame 10 adjacent the rear side rail or bar 12 thereof and the seat frame 76 mounted in the seat frame carriers of the hinges and fastened to the flanges 72 thereof, the seat frame is ready for operation. The back frame 42 is secured to the flanges 38 of the plates 30 of opposite hinge members by passing suitable fastening means through the openings 40 in the flanges 38. By thus connecting the hinges at opposite ends of the base frame to the back frame 42 and the seat frame 76, it will be obvious that both hinges will be operated simultaneously upon moving the back and seat frames. With the parts in the position illustrated in Figures 1 and 2 it will be evident that the latch bar 78 will engage the laterally extending lug 50 on the plate 30. When it is desired to change the position of the back frame 42 and the seat frame 76 in order to make a bed or couch out of the article of furniture, the user grasps the front edge of the seat section 76 and tilts said section upwardly. This action causes the seat and back to move as a unit forward to the position shown in Figure 5 in dotted lines (seat section in vertical position). The user then continues to tilt the seat section rearwardly. As the seat is rotated rearwardly, it pivots on links 64 and 66 causing the latch arm 78 to move forwardly enough to permit the projection on the latch release member 80 to move by lug 50. The seat section is then swung downwardly from its vertical position shown by the dotted lines in Figure 5 so that the seat frame carriers 68 will swing by the links 64 and 66 toward the back frame 42 until the seat frame lies on top of the base frame in overhanging relation to the front side rail 12 of the base frame 10 remote from that adjacent the hinges as shown in Figure 3. Obviously as the seat is lowered, the lug 50 will press against the projection on the latch release member 80 causing said latch release member to rock about its pivot and allow the notch in the latch arm 78 to pass by lug 50. The article is converted from bed to seat position by swinging the seat section upwardly relative to the back section until the notch in the latch arm 78 drops over lug 50 under the influence of spring 82 and locks the seat and back sections together. The seat and back sections are moved as a unit by links 24 and 26 until they are in the position as shown in Figure 2 by moving the seat section downwardly and rearwardly.

The springs 54, in exerting pull on the plates 30, will assist in moving the parts into their respective positions, serving in the capacity of a counterbalance so that the article of furniture can be converted with a minimum amount of exertion on the part of the user.

While in the foregoing there has been shown and described the preferred form of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

We claim:

1. In combination furniture of the character stated, an elongate base frame having end walls and front and rear side walls, elongate links pivotally carried at spaced points by each end wall adjacent to the rear side wall thereof for swinging movement in arcuate paths directed transversely of the frame, an elongate plate carried by each pair of links and having a substantially vertical position when the furniture is set up as a sofa, one link being pivotally attached to the upper end of the adjacent plate and the other link being pivotally attached to the adjacent plate intermediate the ends of the latter, the plates being moved by the links from said substantially vertical position adjacent to said rear side wall to a horizontal position intermediate

said front and rear side wall, a back frame between and carried by said plates for movement therewith from an upright position adjacent to said rear side wall to a horizontal position overlying said rear side, said plates extending at their lower ends a substantial distance beyond the bottom edge of the back frame, a seat frame, a carrier plate secured to each end of the seat frame adjacent to the rear thereof, a pair of links pivotally carried by each carrier plate, the pivots on the carrier plate being spaced apart in a line paralleling the end of the seat frame, the link of each carrier plate pair which is pivoted nearest to the rear of the seat frame being pivotally attached to the adjacent elongate plate at the back edge thereof and at a substantial distance below the lowest one of the pivots of the first links, and the other link of each carrier pair being pivotally attached to the adjacent elongate plate, adjacent to the said lower end of the latter, and a pull spring secured at one end to the lower end of each elongate plate and secured at its other end to the adjacent end wall at a point forwardly of the pivotal points of the elongate links, said pull springs being stretched upwardly and rearwardly when the said back frame and elongate plates are upright and being stretched upwardly and forwardly when the back frame and the elongate plates are in horizontal position.

2. The invention as set forth in claim 1, with a latching link pivotally attached at one end to each carrier plate at the said pivot nearest to the rear of the seat frame, and means for detachably coupling the other end of the latching link to the adjacent elongate plate at a point above the uppermost one of the adjacent carrier plate links.

3. The invention as set forth in claim 1, wherein the means for detachably coupling the other end of the latching link with the adjacent elongate plate comprises a laterally turned lug integral with the said elongate plate and a receiving notch for an edge of said lug carried by the latching link and defined on one side by a pivoted member mounted on the latching link, and spring means connected between each latching link and the adjacent carrier plate and urging oscillation of the latching link into contact with the adjacent lug.

4. A hinge for a sofa-bed comprising a first hinge plate, a first link pivoted at one end thereof to the first plate and adapted to be pivoted at the other end thereof to a fixed point of a sofa-bed, a second link pivoted at one end thereof to the first plate, the other end of said second link being adapted to be pivoted to another fixed point of the sofa-bed, a second hinge plate, a third hinge link pivoted at one end thereof to the first plate and pivoted at the other end thereof to the second plate, a fourth hinge link pivoted at one end thereof to the first plate and pivoted at the other end thereof to the second plate, a locking element on one of said plates, and a pawl movable with the second plate and arranged to engage and lock against the locking element to lock the plates against relative movement when the plates are substantially perpendicular to each other, the pawl being removed from the element when the plates are swung relatively to each other about the ends of the third and fourth links as pivots.

5. The sofa-bed hinge of claim 4, wherein the third and fourth links constitute the only means pivotally connecting the plates.

6. The sofa-bed hinge of claim 4, wherein the locking element is in the form of a recess having a shoulder at a side thereof arranged in the path of the pawl, the pawl being coplanar with the plates.

7. The sofa-bed hinge of claim 4, wherein the first plate has an outstanding flange thereon adapted to be secured to the underface of the back frame of a sofa-bed, and the second plate has an outstanding flange adapted to be secured to the underface of the seat frame of the sofa-bed.

8. The sofa-bed hinge of claim 4, wherein the first link is pivoted at said one end thereof to a point on and near one end of the first plate, and the second link is pivoted at said one end thereof to and at a point on and intermediate the ends of the first plate.

9. The sofa-bed hinge of claim 8, wherein the third hinge link is pivoted at said one end thereof to and at a point intermediate the ends of the first plate and the fourth hinge link is pivoted to said first plate adjacent the other end of the first plate and is pivoted to the second plate at a point intermediate the ends of said second plate.

10. The sofa-bed hinge of claim 4, with a fifth pawl carrying link pivoted at one end thereof to the second plate at the pivot point for the third hinge link, the pawl being pivoted to the other end of the fifth link.

11. The sofa-bed hinge of claim 4, wherein the third and fourth links are arranged in converging and non-intersecting relation.

12. The sofa-bed hinge of claim 4, wherein the third hinge link is arranged entirely on one side of the fourth hinge link.

13. The sofa-bed hinge of claim 4, wherein the third hinge link is arranged entirely on one side of and in converging relation to the fourth hinge link.

14. The sofa-bed hinge of claim 4, wherein distance between the pivoted ends of the third and fourth hinge links on the first plate is greater than the distance between the pivoted ends of the third and fourth hinge links on the second plate.

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