

March 1, 1966

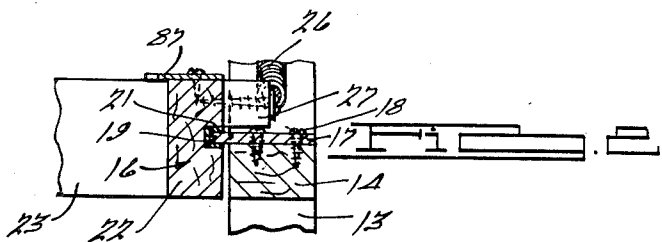
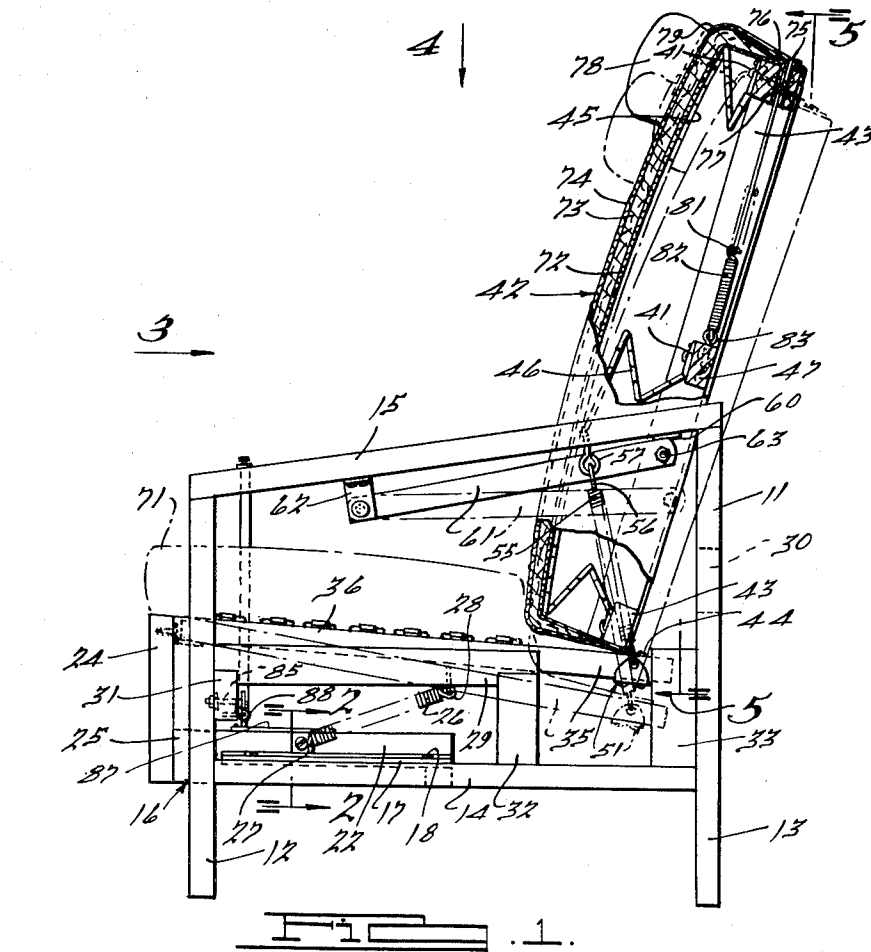
H. C. FLINT

3,237,986

RESILIENTLY SUPPORTED RECLINING CHAIR

Original Filed May 24, 1962

5 Sheets-Sheet 1



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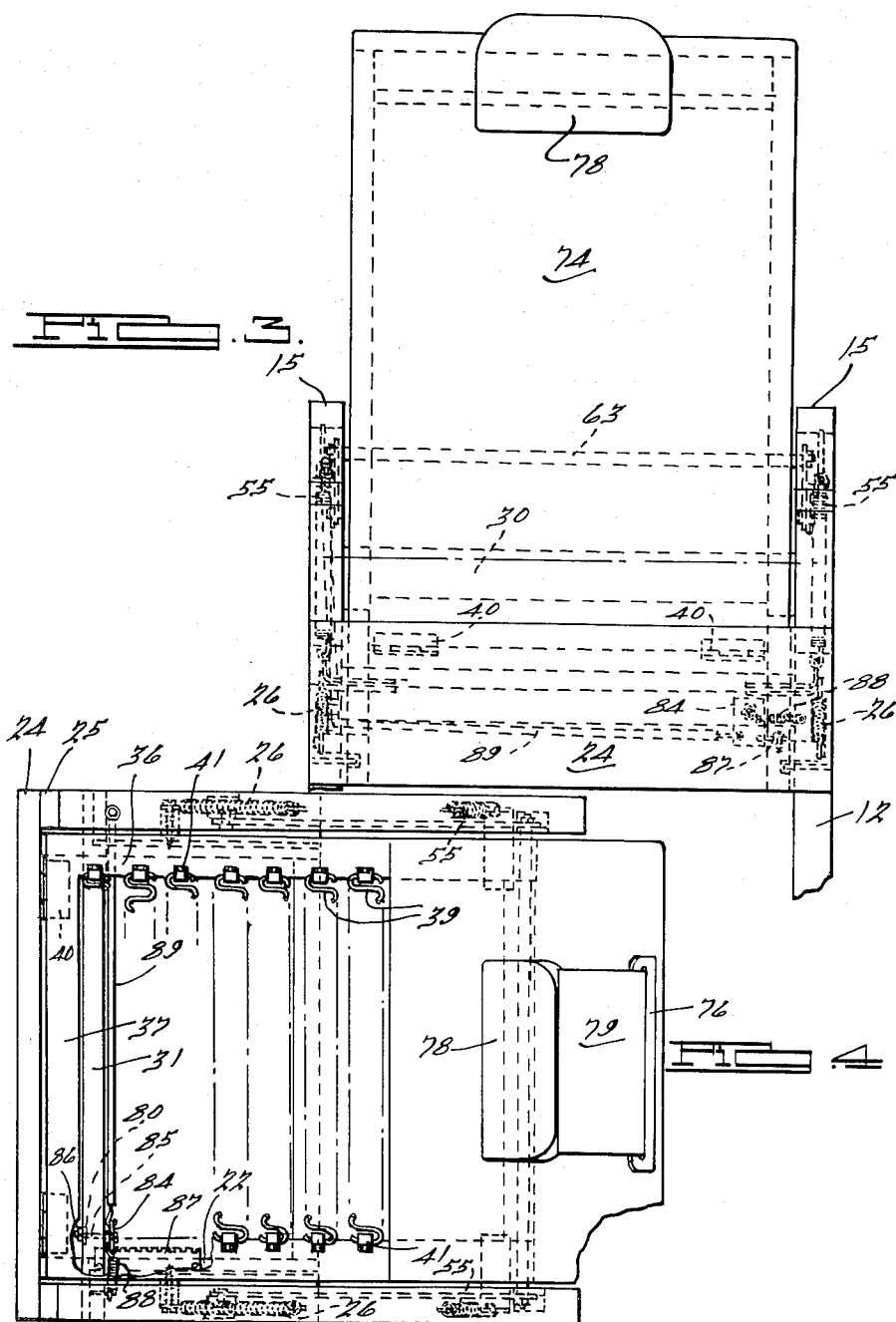
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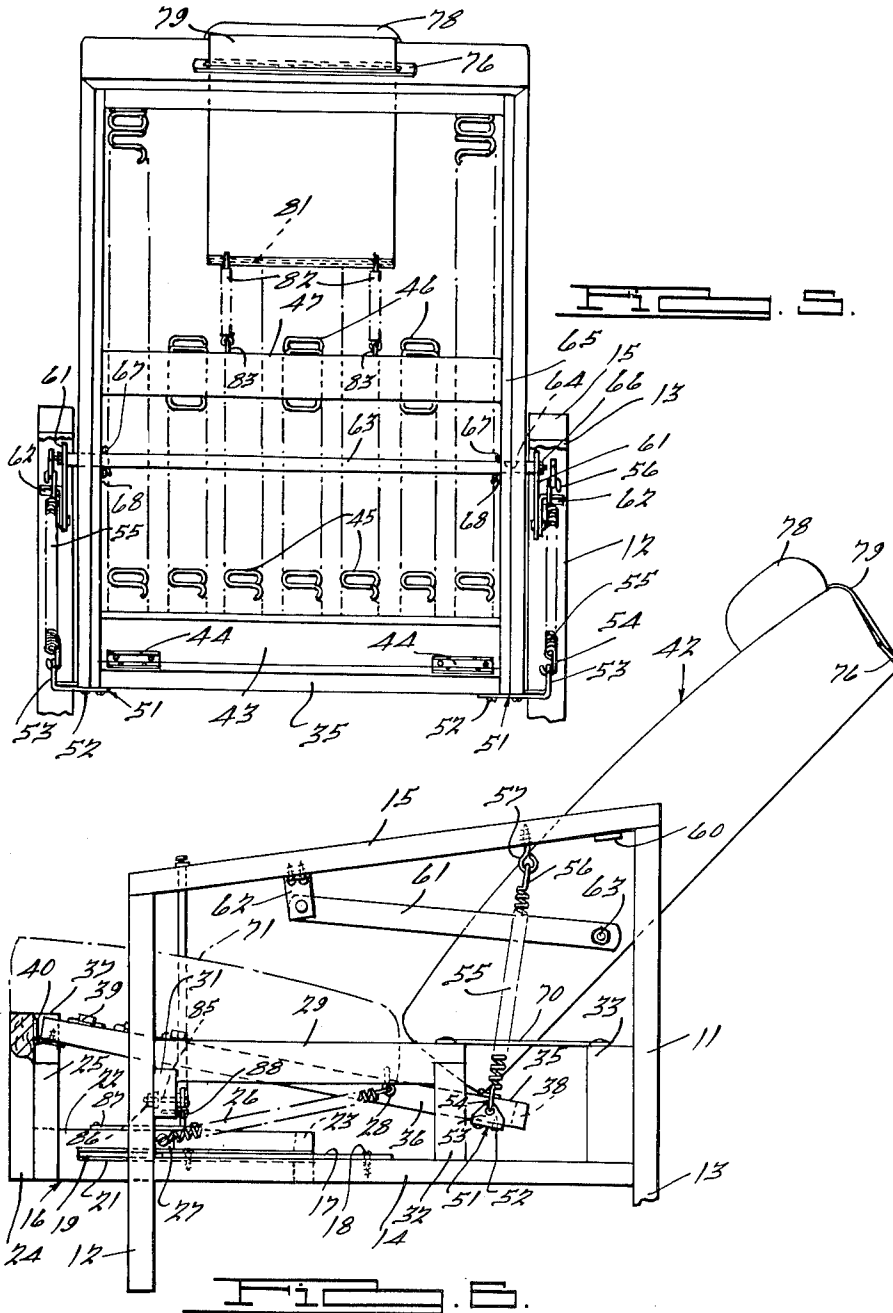
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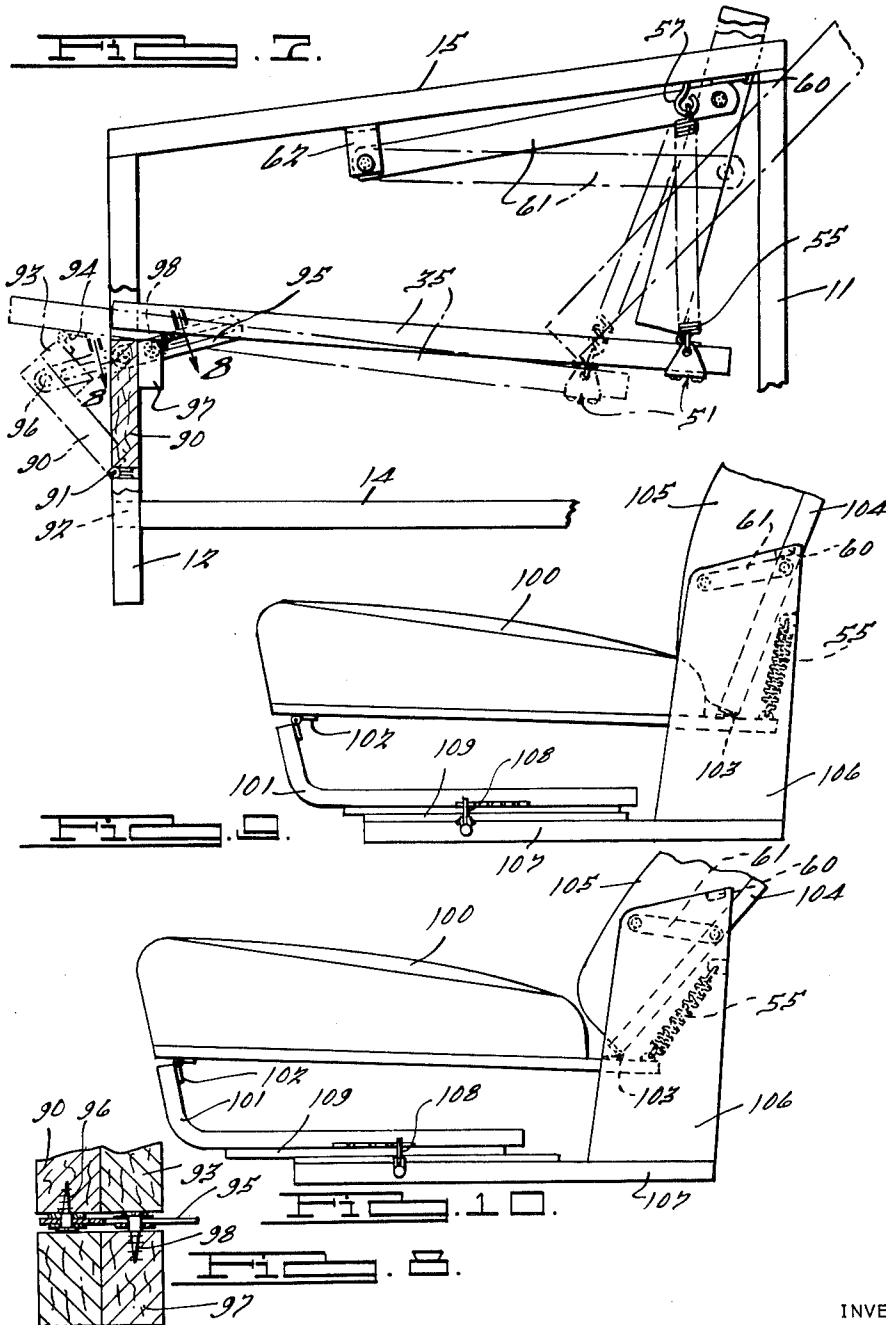
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5 Sheets-Sheet 5

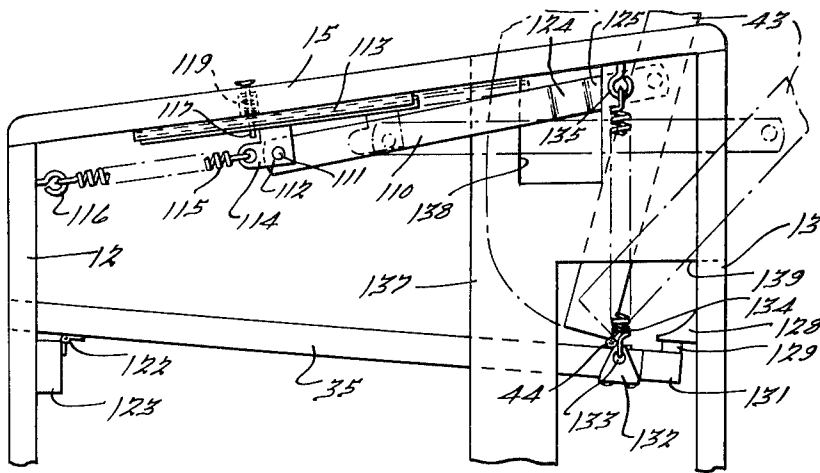


FIG. 11.

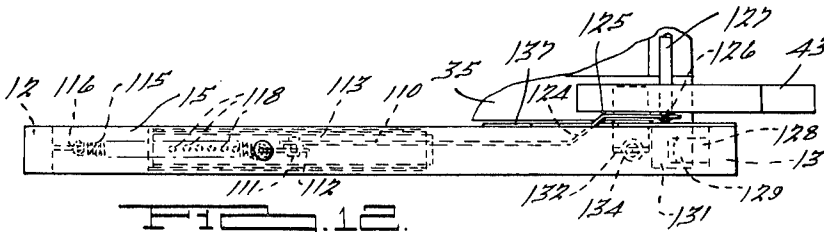


FIG. 12.

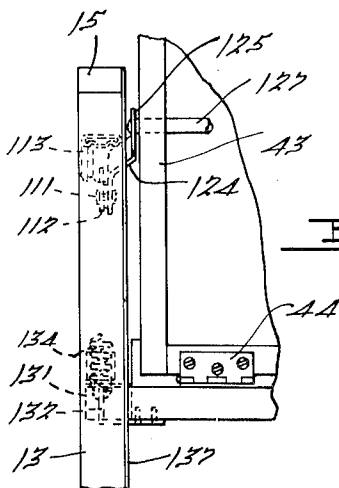


FIG. 13.

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3,237,986

RESILIENTLY SUPPORTED RECLINING CHAIR

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Continuation of application Ser. No. 197,331, May 24,
1962. This application July 29, 1964, Ser. No. 385,972

1 Claim. (Cl. 297—309)

This application is a continuation of application Serial No. 197,331, filed May 24, 1962 in the name of Hyland C. Flint, now abandoned.

This invention relates to unison action reclining furniture and particularly to a unison action chair in which a seat cushion moves forwardly with the attached bottom of the back cushion into reclining position.

The V relationship between the cushions is varied as the seat cushion is advanced to cause the bottom of the back cushion to move forwardly therewith and assume a greater angle to the vertical. In the patent to Flint No. 2,982,343 issued May 2, 1961, for Chair Construction, an overstuffed chair is illustrated having the seat and back cushions pivoted together to permit the angle of the back cushion to change slightly relative to the vertical as the cushion moves upwardly and downwardly with the rear end of the seat cushion. The back cushion is prevented from falling backwardly on the pivot at the rear of the seat cushion by a link which is pivoted to the base structure and the back cushion.

The present invention is an improvement over the structure illustrated in the above-mentioned patent and is applied to the chair in such a manner as to permit the seat cushion to advance forwardly on its support and the back cushion to move into reclining position as the V relationship between the cushions is enlarged. The supporting structure may be placed in the hollow of the chair arms or may be placed within a recess in uprights disposed at the sides of the back cushion. This latter permits the novel arrangement of the present invention to be applied to automobile seating. The present invention not only provides for the unison action of the seat and back cushions but also maintains such action when the seat and back cushions have been moved to recline the back cushion.

Accordingly, the main objects of the invention are: to provide a reclining chair in which the seat cushion moves forwardly along with the bottom edge of the pivoted back cushion which is suspended on springs; to provide a floating reclining chair having a seat cushion which when moved forwardly on a base tilts the back cushion into greater V angle relation about a pivot point which is free to move in a vertical position; to mount a cushion support for forward and rearward sliding movement on a base and pivot the forward end of a frame to the forward end of the cushion support which has its rear end pivoted to the bottom of a back cushion and is resiliently supported for vertical and tilting movement; and, in general, to provide a resiliently suspended reclining chair which is simple in construction and economical of manufacture.

Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a broken view in elevation of a reclining chair embodying features of the present invention.

FIGURE 2 is an enlarged broken sectional view of the structure illustrated in FIGURE 1, taken on the line 2—2 thereof.

FIGURE 3 is a plan view of the structure illustrated in FIGURE 1, as viewed from point 3 thereof.

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FIGURE 4 is a plan view of the structure illustrated in FIGURE 1, as viewed from point 4 thereof.

FIGURE 5 is a rear view of the structure illustrated in FIGURE 1, as viewed from line 5—5 thereof.

FIGURE 6 is a view of the structure illustrated in FIGURE 1 when disposed in reclining position.

FIGURE 7 is an enlarged, broken sectional view of structure, similar to that illustrated in FIGURE 1, showing another form of the invention.

FIGURE 8 is an enlarged sectional view of the structure illustrated in FIGURE 7, taken on the line 8—8 thereof.

FIGURE 9 is a view of structure, similar to that illustrated in FIGURE 1, showing a still further form of the invention.

FIGURE 10 is a view of the structure illustrated in FIGURE 9 showing the cushions in reclining position.

FIGURE 11 is a view of structure, similar to that illustrated in FIGURE 7, showing a further form which the invention may assume.

FIGURE 12 is a broken plan view of the structure illustrated in FIGURE 11, and

FIGURE 13 is a rear view of the structure illustrated in FIGURE 12.

Referring to FIGURES 1, 2, and 3, the present invention is illustrated as a reclining chair and will be described in detail as a disclosure of a specific embodiment of the invention. It is to be understood that the seat and back cushions of the chair may take different forms from that herein illustrated and that the base and side members which form the arms may likewise assume other shapes or may be eliminated when inwardly facing recessed posts are disposed at the sides of the seat back cushion.

The chair of the present invention embodies a pair of side members 11 of like construction having front legs 12, rear legs 13 interconnected by a brace 14 near the bottom and a supporting arm 15 at the top. A movable frame 16 is supported between the side members 11 on plates 17 secured thereto by screws 18 or by other means. The plates are positioned to extend inwardly of the bottom braces 14 so as to project within a central slot 19 of channel members 21 which are embedded in the adjacent faces of the frames 16. Either the plates 17 or the members 21 are made of metal or plastic so that the plastic can ride upon the metal or the metal ride upon the plastic to provide low friction engagement.

The frame 16 functions as a sliding member somewhat like a drawer of a desk and consists of side members 22, a rear cross member 23 and a front cross member 24. The side members 22 have a slot therein in which the channel-shaped member 21 is secured. The front cross member 24 is of substantial height relative to the rear cross member and is extended laterally to be in aligned relation with the front legs 12. Stop blocks 25 are applied to the ends of the front cross member 24 on the rear face thereof to abut against the front face of the legs 12 when in rearmost position. A spring 26 at each side of the chair is secured by a bracket 27 to the side members 22, the opposite end being secured by a screw eye 28 located on the bottom edge of a brace 29. A portion of the inner trim material on the arms 15 is secured to the brace by tacks or other means. The forward end of the brace 29 is secured to the front legs and to a cross member 31 which connects the two side members 11. Spaced cross members 30 connect the rear legs of the side frames to form a rigid structure. The rear end of the brace 29 is supported by an upright 32 extending upwardly from the bottom brace 14. A block 33 connects

the bottom brace 14 to the rear leg 13 on the inner faces thereof to reinforce the corner and the side frames.

A cushion supporting frame 35 is of rectangular construction having side members 36, a front cross member 37, and a rear cross member 38. Sinuous spring strips 39 extend transversely across the frame 35, being secured to the side members 36 by suitable clips 41 in a conventional manner. A back cushion 42 has a frame 43 which is secured to the rear end of the cushion frame 35 by hinges 44. Vertically extending sinuous spring strips 45 are secured by clips 41 between the bottom and top of cross members of the back frame 43. Shorter sinuous spring strips 46 extend between the bottom cross member of the frame and a central cross member 47. The springs 45 and 46 alternate with each other starting from the springs 45 which are located at the side edges of the frame.

An angle-shaped bracket 51 is secured to each side of the rear end of the cushion frame 35 by suitable means herein illustrated as by screws 52. An upstanding arm 53 of the brackets is spaced outwardly from the sides of the frame and has an aperture therein in which a hook 54 on the end of a coil spring 55 extends. The hook 56 on the opposite end of the spring is secured in an eye of a screw eye 57 which is secured to the under face of the arm 15. The spring 55 at each side of the side frames 11 supports the rear end of the cushion frame 35 for up and down movement about the pivots of the hinges 40 which connect the front end of the frame 35 to the inner face of the front cross member 24 of the frame 16.

The back cushion 42 moves up and down with the rear end of the cushion frame 35 and is retained in angular position relative to the frame 35 by links 61. The links have their forward ends pivoted to brackets 62 on the inner face of the arm 15 and their rear ends secured to the ends of a rod 63 which extend through apertures 64 in upstanding frame members 65 of the back frame 43. After the apertures at the ends of the links 61 receive the threaded ends of the rod 63, nuts 66 secure the links 61 to the rod. Cotter pins 67 extend through the rod adjacent the inner surface of the members 65 spaced therefrom by one or more washers 68 to accurately position the ends of the rod from the sides of the back cushion frame. A bumper 60 on the underside of the arms 15 is positioned to be engaged by the rear end of the arm 61 when urged upwardly by the springs 55, which have a predetermined tension as a result thereof. The frame 35 has a cover material tacked thereover to enclose the springs and a T cushion 71 is loosely supported thereon. Springs 45 and 46 of the back cushion are covered by a material 72 over which a layer of padding material 73 of foam rubber, cotton or the like is placed for supporting trim material 74 in the conventional manner. The trim material at the top of the cushion has a slot 75 aligned with a slot in the top cross member of the frame 43. The hole through the fabric is covered from view by a flange 76 of an elongated slotted element 77 which extends within the slot in the cross member.

A headrest 78 has a strip of fabric 79 extending therefrom and through the aperture in the elongated slotted element 77. The strip has a rod 81 disposed in a hem in the edge of the strip 79 within the cushion which is engaged by hook ends of coil springs 82. The opposite ends of the coil springs are secured in the eyes of screw eyes 83 which are secured to the central cross member 47 of the back frame 43. The springs permit the positioning of the headrest at or spaced from the top edge of the back cushion depending upon the height of the occupant. The strip 79 may be pulled upwardly through the element 77 against the tension of the springs 82 and brought forwardly across the top edge of the cushion when the headrest is disposed thereon. In this position, the tension of the springs 82 is insufficient to retract the strip 79 within the cushion. If the headrest is not to be employed, the springs 82 are permitted to retract the

strip 79 within the cushion with a portion thereof supporting the headrest at the back of the frame.

The chair is illustrated in vertical upright position in FIGURE 1, retained therein by a swinging latch plate 84 which is secured to the cross member 31 by a bolt 85 threaded into an embedded T nut 80 and locked in such position by a nut 86 so as to assure the free movement of the latch plate thereon. A notched plate 87 is secured to the top of one of the side members 22 of the frame 16 in position to have the latch plate swing into engagement with a notch thereof by the bias of a spring 88. Suitable means are provided to operate the latch to unlatched position and, by way of example only, a Bowden wire 89 is secured to the lower part of the latch plate 84 and disposed transversely along the cross member 31. The wire 89 is extended up along the right-hand leg 12 and through the adjacent portion of the arm 15. A knob is provided on the end of the wire in position to be grasped by the hand of an occupant for pulling or pushing on the wire to thereby swing the plate to latched or unlatched position.

When a person sits on the chair illustrated in FIGURE 1, the cushion 71 will move downwardly and thereafter change its vertical position as the weight of the person is changed. It will be noted that the V relation of the adjacent cushion surfaces is substantially at right angles. If the person desires to recline, the knob on the Bowden wire is pulled upwardly to swing the plate 84 out of a notch of the plate 87 to permit frame 16 to be moved forwardly by the weight of the person pushing against the back cushion. The rod 63 of the back cushion will move from a position illustrated in FIGURE 1 above a horizontal plane through the pivot of the bracket 62 to a position illustrated in FIGURE 6 with the rod in or below the plane. It is necessary that the rod 63 move downwardly in this manner to permit the back cushion to tilt without binding. The distance between the rod 63 and the axis of the hinges 44 remains fixed, and the forward movement of the seat cushion and hinges causes the back cushion to pivot around the rod 63. This would raise the hinge if the rod did not move downwardly, which movement occurs on an arc about the pivot of the bracket 62. In any of the advanced positions of the frame 16, the knob of the Bowden wire may be moved downwardly to swing the latch plate 84 into engagement with a notch in the plate 87 and thereby lock the frame 16 in fixed position with the back cushion in angular relation to the seat cushion. The V angle between the cushions enlarge as the frame 16 is further advanced forwardly. In any of the positions of the frame 16, the cushion supporting frame 35 and the back cushion 42 are supported on the springs 55. The cushion frames are free to move upwardly and downwardly in unison as a change in load occurs at the rear portion of the seat cushion. Not only do the springs 55 permit the unison action of the cushions but since the springs elongate, the movement of the cushions occurs without any binding of the links or frames. The springs 55 are in the nature of elongatable supporting links having sufficient tension to maintain the rear end of the frame 35 substantially in the horizontal position when the frame 16 is moved forwardly or rearwardly.

By pulling on the Bowden wire 89, the latch 84 is released, permitting the occupant to push backwardly with the feet to move the frame 16 backwardly and thereby swing the back cushion 42 forwardly about the rod 63 as the rod moves upwardly about the pivot of the bracket 62 to the position illustrated in FIGURE 1. The Bowden wire may then be pushed downwardly to swing the latch 84 into notch engaging position for locking the frame 16 in fixed relation to the side frames 11 of the chair.

Referring to FIGURES 7 and 8, a further form of the invention is illustrated, that wherein the cross member 90 is secured by hinges 91 to a front cross member 92 between the legs 12 of the side frames 11. Blocks 93 are

secured to the inner faces of the cross member 90 on the inner face of which a leaf of a hinge 94 is secured. The other leaf of the hinge is secured to the underside of the frame 35 near the forward edge thereof. A stop link 95 is secured to the cross member 90 by a screw 96 and to a block 97 on the inner face of the cross member 90 by a screw 98. With this arrangement the chair has two positions, an upright position and a reclining position. When the frame 35 is in the solid line position of FIGURE 7 with the cross member 90 aligned with the legs 12, the cushions 71 and 42 are in the position illustrated in FIGURE 1. When the frame 35 has been swung in forward position by the forward tilting of the cross member 90 as illustrated in dot-dash lines in FIGURE 7, then the back is swung rearwardly about the rod 63 in a manner as described hereinabove to be in sloping position substantially as illustrated in FIGURE 6. When the occupant pushes backwardly on his feet, the frame 35 will swing backwardly, the back cushion frame will swing forwardly, and the cross member 90 will swing rearwardly into aligned relation with the front legs 12 to be in the position as illustrated in FIGURE 1.

A further form of the invention is illustrated in FIGURES 9 and 10, that wherein a seat cushion 100 is secured on a base frame 101 by a hinge 102 secured at the front end thereof. The rear portion of the cushion 100 is secured by a pivot 103 to a back frame 104 having a back cushion 105 thereon. Uprights 106 in alignment with the back cushion 105 have facing surfaces recessed to contain the links 61 and the supporting springs 55. The cushions so arranged are for an automotive vehicle. The base frame 101 is secured to a longitudinally movable track 109 which is secured along with the uprights 106 to a base member 107 attached to the floor of the vehicle. The cushions 100, 105 are shown in normal seating position in FIGURE 9, while in FIGURE 10 the cushions have had the angular V relation thereof enlarged to form a reclining seat.

The cushions are maintained in various angular V relation to each other by a latching mechanism 108, similar to those now employed on the longitudinally adjustable tracks of automotive vehicles. By releasing the latching mechanism 108, the occupant may lean backward to tilt the back cushion as the seat cushion moves forward to a position retained by the latching mechanism. Upon releasing the latching mechanism 108, the seat cushion is moved backwardly to swing the back cushion upwardly to normal driving position, as illustrated in FIGURE 9.

In FIGURES 11, 12, and 13, a still further form of the invention is illustrated, that wherein the arm 110 at each side of the chair has its front end secured by a pivot 111 to a bracket 112, the base of which slides in the track 113 secured on the underside of the arms 15. The bracket 112 has an eye 114 to which one end of a spring 15 is secured, the other end being secured in the eye of a screw eye 116 to the rear face of the front legs 12. A plunger 117, carried in a recess within the arm 15, extends through the track 113 and through one of a plurality of apertures 118 in the base of the bracket 112. The plunger 117 is urged downwardly by a spring 119 so as to extend through an aperture 118 and produce a lock for positioning the bracket 112 within the track 113. The plunger is raised out of the aperture 118 upon the upward movement of a button 121 which is secured to the upper end of the plunger. The button may be retained in raised position while the back is being tilted rearwardly until the approximate position desired by the occupant is reached, whereupon the button is released and the spring 119 forces the plunger into the next adjacent aperture 118.

A hinge 122 pivotally supports the frame 35 to a cross member 123 which is attached to the rear face of the front legs 12. The hinge permits the upward and downward movement of the rear end of the frame 35 and prevents

the frame from moving forwardly or rearwardly of the cross member 123. The back frame 43 is secured by the hinge 44 to the rear end of the frame 35 and the sliding of the bracket 112 in the track 113 moves the back frame 43 to different angular positions relative to the seat frame 35. The track 113, the bracket 112, the spring 115, and the arm 110 are all disposed within the width of the arm 15 so as to be enclosed within the area thereof when upholstering material is applied to the inner and outer faces thereof. The rear end of the frame 31 extends within the arms 15 and the arms 110 extend inwardly of the inner face of the arm 15. For this reason, the arm 110 is bent diagonally at 124 and extended rearwardly at 125 and provided with an aperture which extends over a reduced portion 126 of a rod 127 which projects through the back frame 43. The reduced end is then riveted to form a head which secures the end portions 125 of the arms 110 to the ends of the rod 127.

The rear legs 13 have stop elements 128 secured on the inner face thereof in position to engage stops 129 carried on the upper face of the rear cross member 131 of the frame 35. A bracket 132 extends outwardly of each side of the frame 35, having an aperture 133 into which one end of a spring 134 extends, the opposite end of the spring being hooked into the eye of a screw eye 135 on the underside of the arms 15. The springs are so selected as to produce a predetermined force for holding the rear end of the frame 35 upwardly against the stops 128 and provide a predetermined resistance against downward deflection when a load is applied to the chair. The ends of the cross member 131, the bracket 132, and the diagonal portion 124 extend within the arms, and openings must be provided on the inner face of the arm assemblies.

When the back frame 43 has springs applied thereto, along with the padding and trim material, the contour thereof is illustrated by the dotted line 136 which is forwardly of the openings in the arms. A panel of cardboard, plastic or other material 137 has an opening 138 therein for permitting the offset portion 124 of the arm 110 to move upwardly and downwardly when extending therethrough. A similar opening 139 permits the brackets 132 and the ends of the cross member 131 to extend therethrough and move upwardly and downwardly when the chair is occupied. The upholstery material is adhered to the face of the sheet 137 and the sheet is adhered or otherwise secured to the inner face of the arm assemblies.

A similar arrangement is employed in the chair illustrated in FIGURE 6 wherein a wire 70 bridges the brace 29 and the block 33 at each side of the chair. The wire extends through a hem of the trim material and forms the top edge of an opening between the upright 32 and block 33 in which the bracket 51 moves.

The action of the chair illustrated in FIGURES 11 to 13 is similar to that of the other figures, with the exception that the arms 110 have the supporting brackets mounted on tracks so that the back can tilt rearwardly rather than move the seat frame 35 forwardly to tilt the seat back rearwardly. The comfort provided by the widening of the V arrangement of the seat and back cushions is the same in all of the structures, the apex of the V being supported on springs to permit the cushions to float in any position of the V relationship.

I claim:

A reclining chair comprising:

- a base frame;
- a seat support structure pivotally mounted on said base frame and angularly movable relative thereto;
- a back frame pivotally connected to the rear of said seat support structure for substantial changes in angularity therebetween to recline said back frame;
- a link pivotally secured at one end to said base frame above said seat support structure and pivotally secured to said back frame at the other end above the pivot connection between said back frame and said

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seat support structure to maintain substantially the same angular relationship between said back frame and said base frame when said seat support structure moves angularly relative to said base frame, the end of said link secured to said base frame being movable relative to said base frame to permit the angularity of said back frame to be changed relative to said base frame;
latch means operatively connecting said link and said base frame to permit latching said link in any of a plurality of positions to recline said back frame;
and a spring secured to said base frame and to said seat support structure adjacent said pivotal connection between said back frame and said seat support structure to support the rearward portion of said seat support structure and said back frame.

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15 FRANK B. SHERRY, *Primary Examiner.*