

Sept. 24, 1957

J. W. SELLNER
ADJUSTABLE CHAIR

2,807,310

Filed June 11, 1953

3 Sheets-Sheet 1

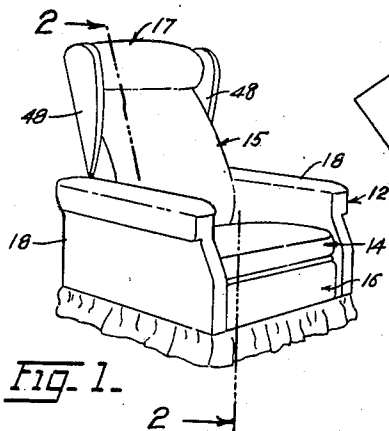


Fig. 1.

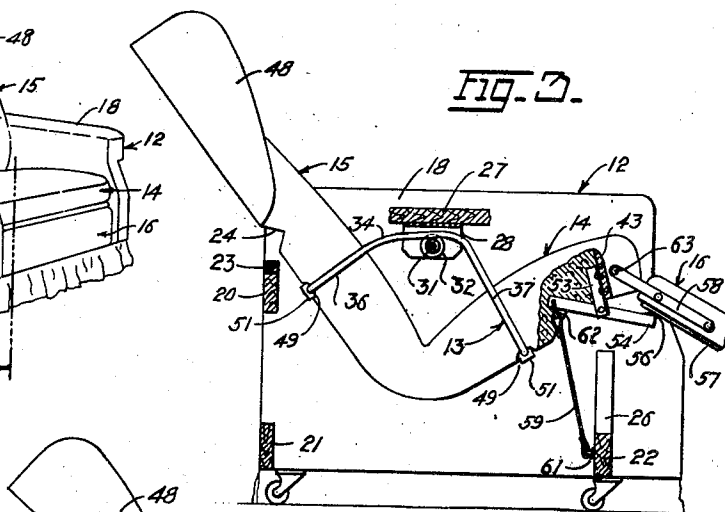


Fig. 2.

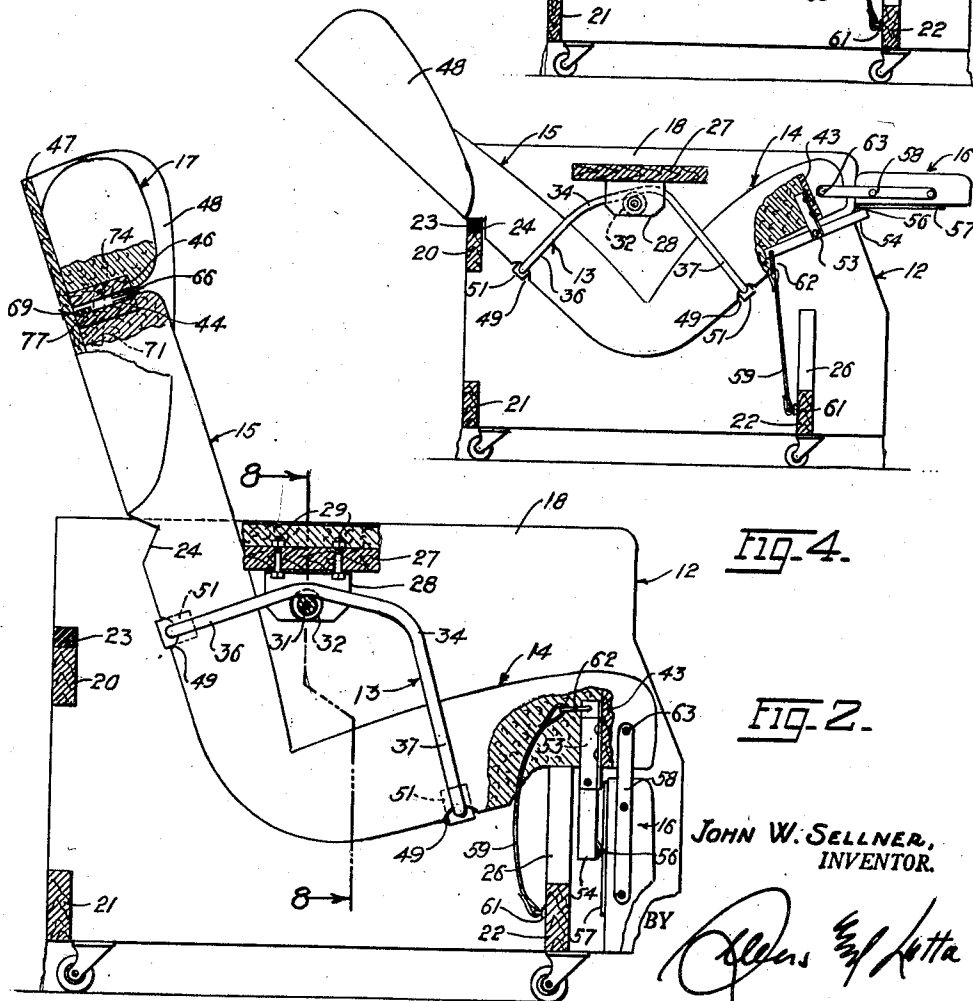


Fig. 3.

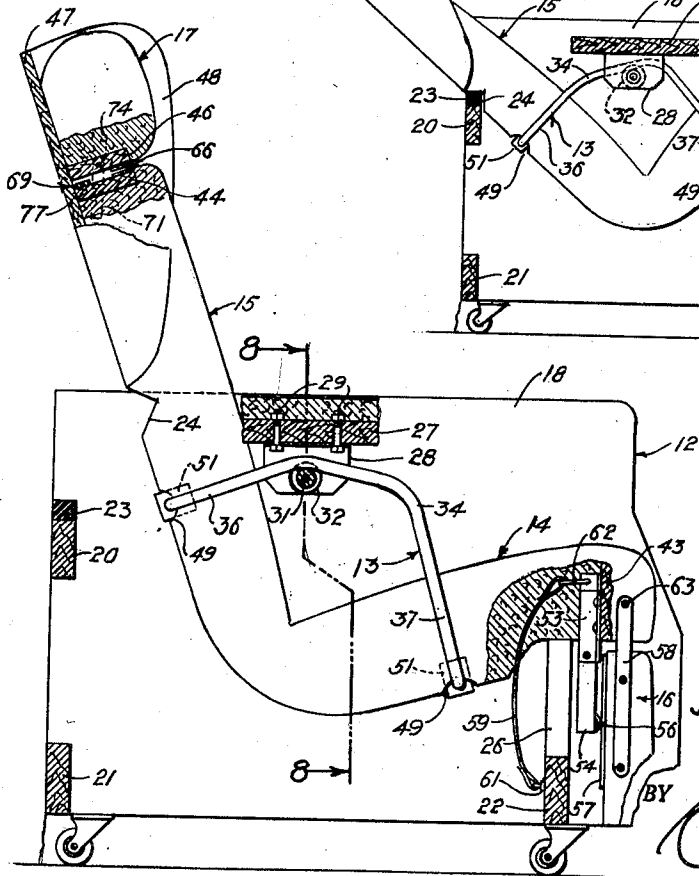


Fig. 4.

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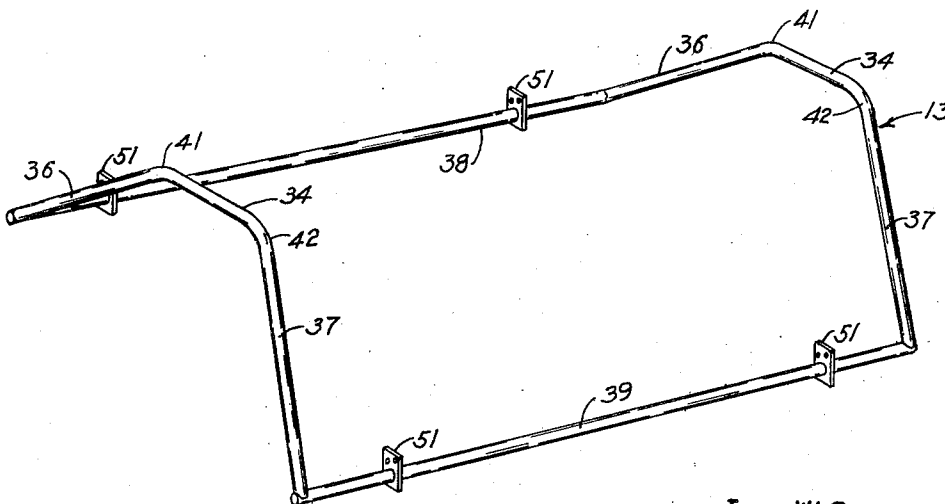
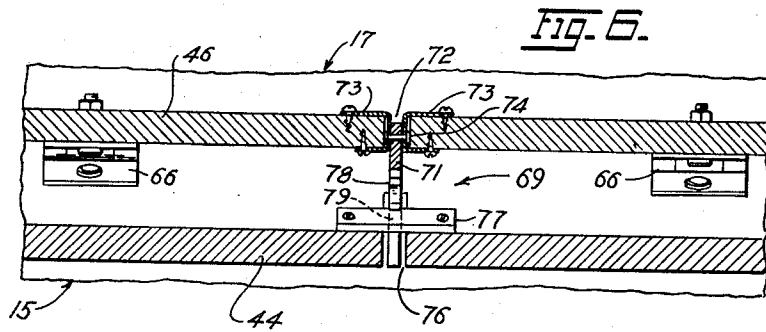
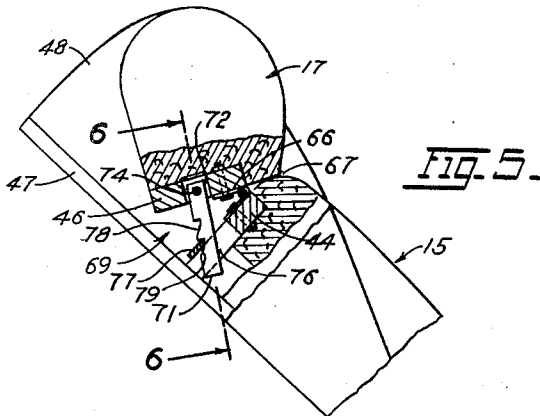


Fig. 7.

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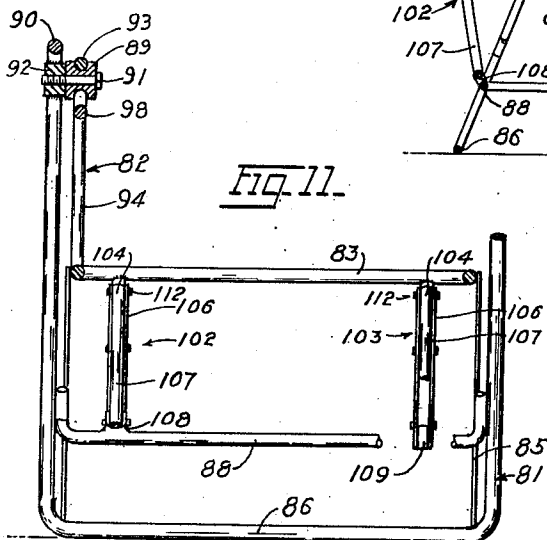
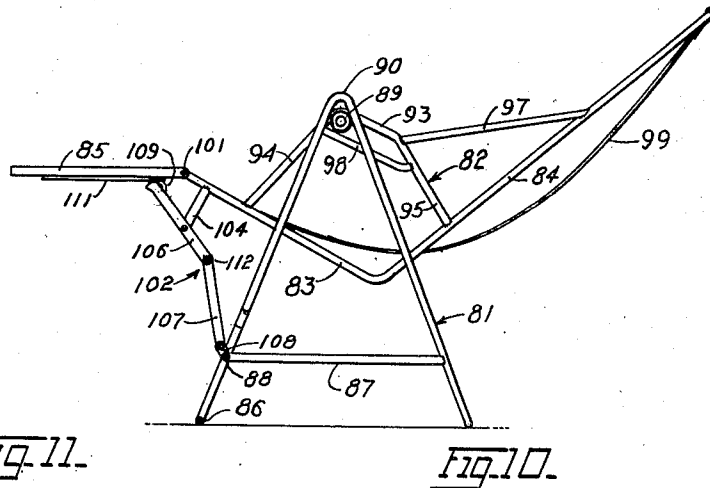
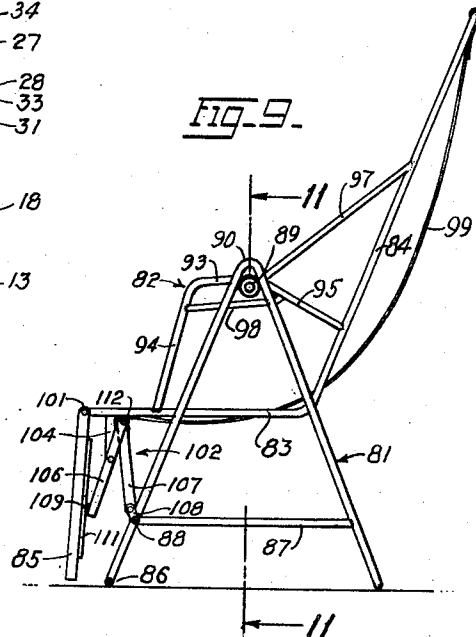
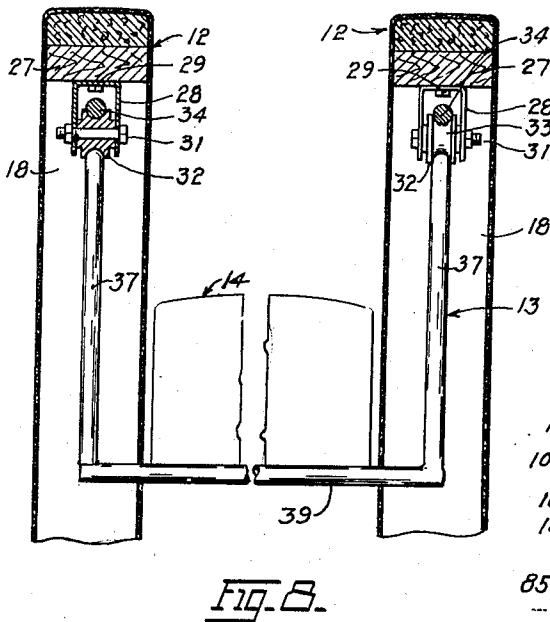
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2,807,310

ADJUSTABLE CHAIR

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Application June 11, 1953, Serial No. 361,033

5 Claims. (Cl. 155—106)

This invention relates to an adjustable chair, and particularly to a chair of the reclining type embodying leg rest means adapted to shift to selected supporting positions upon pivoting of the chair seat and back to an inclined condition.

In using adjustable reclining or contour chairs of the types presently known, it is common experience that the relatively complicated adjustment levers, detents, cranks, etc., conventionally embodied in such chairs present certain complexities somewhat bewildering to the average person. The various levers, etc., also greatly increase the weight and cost of production of the chairs, as well as the likelihood of breakage and the necessity for repair or replacement of parts.

In view of the above problems characterizing the field of reclining chairs, it is an object of the present invention to provide an adjustable chair adapted to automatically lock in a number of inclined or vertical positions without the manual manipulation of auxiliary adjustment or locking means.

Another object is to provide a reclining chair embodying a leg rest adapted to automatically extend into leg-supporting position as the chair is pivoted to a reclining condition, the leg rest mechanism serving while supporting the legs or feet of the user to lock the chair in any selected inclined position.

An additional object is to provide a reclining chair entirely supported by rails riding on a cradle support at a location above the seat portion of the chair, there being no supporting elements extending from adjacent the floor to engage the chair seat or back.

These and other more specific objects and advantages of the invention will be more fully appreciated upon a reading of the following specification and claims considered in connection with the attached drawings to which they relate.

In the drawings:

Figure 1 is a perspective view of an upholstered chair embodying the invention;

Figure 2 is a vertical section taken along line 2—2 of Figure 1, showing the chair in its upright position;

Figure 3 corresponds generally to Figure 2 but illustrates the chair in a partially inclined position;

Figure 4 corresponds to Figures 2 and 3 and shows the chair in its fully inclined position;

Figure 5 is a detail side view illustrating the adjustable head rest in a forwardly pivoted head supporting position, with parts broken away to better illustrate the latching or locking means;

Figure 6 is a vertical section along line 6—6 of Figure 5;

Figure 7 is a perspective view of the cradle member forming the sole support for the seat and back of the chair;

Figure 8 is a vertical section along lines 8—8 of Figure 2;

Figure 9 is a side elevation of an unupholstered porch or patio type chair embodying the invention, illustrating the chair in upright condition.

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Figure 10 is a side elevation showing the chair of Figure 9 in its fully reclined position; and

Figure 11 is a vertical section along line 11—11 of Figure 9, as viewed in the direction of the arrows and with parts broken away to better illustrate the structure.

Referring to the embodiment of the invention illustrated in Figures 1—8, the apparatus may be seen to comprise generally a cradle support 12, a chair cradle 13 suspended from the upper portion of cradle support 12 in a shifting pivot relation, and a rigidly connected angularly disposed chair seat 14 and chair back 15 supported by cradle 13 for adjustment to various reclining or upright positions. The apparatus further comprises a leg or foot rest 16 adapted to automatically retract and extend during adjustment of the chair, and a head rest 17 normally in alignment with the back-supporting surface of back 15 but adjustable to several upwardly or forwardly pivoted positions when chair back 15 is inclined.

In the present embodiment of the invention, the cradle support may be seen to comprise two vertically disposed rectangular chair arms 18 maintained in spaced relation by three horizontal cross bars or braces 20, 21, and 22. The cross bar 20 extends between the rear edges of arms 18 a substantial distance beneath their upper corners, and cross bars 21 and 22 are respectively disposed between the rear and forward lower corners of the arms. Suitable rubber stops 23 on the upper surface of cross brace 20 are adapted, as best illustrated in Figure 4, to engage a notched portion 24 of chair back 15 and limit its inclining movement. The adjusting movement of the chair in the reverse direction, from an inclined to an upright position, is limited by a pair of vertical posts 26 mounted at opposite ends of cross bar 22 for engagement with the underside of chair seat 14 as illustrated in Figure 2.

Each of the chair arms 18 is formed with a suitably braced strong rectangular frame, not shown, rigidly connected to the cross bars 20, 21, and 22. The upper horizontal beam 27 of each frame, illustrated in Figures 2—4, and 8, serves to support a U-shaped bracket 28 by means of suitable bolts 29 extending upwardly through the horizontal bracket base or web. The downwardly extending side flanges of each bracket 28 are adapted by means of a horizontal bolt 31 to rotatably support a wheel or roller 32, the bearing being preferably of the relatively frictionless self-oiling type. As shown in Figure 8, each roller 32 is formed with an annular groove 33 to seat a cylindrical rail portion 34 of chair cradle 13, the rail portion being prevented from shifting out of position due to the proximity of the web of bracket 28.

Referring to Figure 7, the rail portions 34 of chair cradle 13 are integral at their opposite ends with connecting portions 36 and 37 extending, respectively, for welded connection to chair back and seat supporting horizontal cross portions 38 and 39. The junctions between the ends of rails 34 and the integral connecting portions 36 and 37 are bent at 41 and 42 to form obtuse angles, the angles being such that a plane containing both of the connecting portions 37 and the cross bar 39 is substantially perpendicular to the plane of connecting portions 36 and cross bar 38. In addition, the common plane of rails 34 is only slightly inclined relative to the common plane of support bars 38 and 39. Furthermore, each rail 34 and the associated connecting bars 36 and 37 are in a vertical plane perpendicular to the common plane of back and seat support rods 38 and 39. With the illustrated cradle construction, the obtuse angle portions 41 tend to remain in engagement with rollers 32 when the chair is in the upright position illustrated in Figure 2, while the opposite angle portions 42 are adjacent rollers 32 when the chair is in the fully inclined position shown in Figure 4. The rails 34 thus ride along rollers 32 to provide a shifting pivot relationship operating to adjust the center of

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gravity of the chair to the desired positions for both reclining and vertical postures.

The seat portion 14 of the chair may be of any suitable padded construction embodying side frames, not shown, as well as cross members such as the transverse board 43 illustrated in Figures 2-4. The underside of chair seat 14 is open to provide clearance for linkage means adapted to automatically elevate the leg rest 16 as will subsequently be described. Back portion 15 of the chair, which is integral with seat portion 14, is also of any suitable construction embodying side frames, not shown, as well as suitable cross boards. For example, the upper cross board 44 shown in Figures 2, 5, and 6 is adapted to provide a hinged mounting for a corresponding cross board 46 of head rest 17. In the illustrated construction, the chair back 15 includes a longitudinal board or portion 47 extending upwardly behind head rest 17 to support a pair of wing elements 48 between which the head rest 17 is nested. To provide a mounting for cradle 13 the back and seat of the chair are notched or grooved at 49, and suitable brackets 51, welded to cradle bars 38 and 39, are secured by screws to the inner portions of the chair frame as illustrated in Figure 2. In this manner, the chair seat and back 14 and 15 are nested in the cradle 13 to pivot and shift with it as the rails 34 ride along supporting rollers 32.

It is to be understood that the various components of the chair against which the user rests are provided with suitable padding material, preferably foam rubber, and that any suitable covering material may be employed. The covering material, which may be leather, plastic, or cloth, is slotted where necessary to provide space for various chair elements such as the outer ends of cradle portions 38 and 39.

Proceeding to a description of the means for elevating leg rest 16 as the chair is tilted to an inclined position, a vertical pivot support bracket 53 is bolted to the center of cross board 43 in chair seat 14 and extends downwardly for pivotal connection at its lower end to the mid-portion of a friction lever 54. The outer end of said lever is provided with a rounded friction component 56 adapted to slide along friction or brake band 57 mounted on the undersurface of leg rest 16, the latter being pivotally connected to the forward portion of chair seat 14 as by side straps 58. The opposite or inner end of lever 54 is connected by an actuating link 59 to a footman's catch 61 on the inner surface of cross bar 22 of cradle support 12. Link 59 is preferably a canvas strap of predetermined length and is sewn at one end over the catch 61 and at the other end to a buckle or hinge member 62 on the inner end of lever 54. When the chair is in the upright position shown in Figure 2, the leg rest 16 hangs downwardly from its pivot points 63 and is nested within side extensions of arms 18, the flexible strap 59 then being loose and the friction lever 54 being vertical as shown. As the chair seat 14 pivots upwardly during adjustment of the chair, so that support bracket 53 is elevated, the flexible link 59 tightens and then serves to rotate friction lever 54 counterclockwise in Figures 2-4 to cause sliding movement of friction component 56 along brake band 57. This operates, for example as the chair is swung into the fully inclined position shown in Figure 4, to shift friction component 56 from the mid-portion to the upper edge of the friction band 57 and thus pivot leg rest 16 to a substantially horizontal extended position. The leg rest may then serve to support the feet or lower legs of the user, but will automatically swing down to the position of Figure 2 when the chair is adjusted to its upright condition.

According to the invention, either or both the friction component 56 and brake band 57 are formed of rough fibrous or rubbery material having a sufficient coefficient of friction to lock the leg rest, and thus the chair back and seat, against rearward pivotal movement when a downward force, such as the weight of the legs and feet

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of the operator, is applied. In this manner the chair may be locked against rearward pivoting merely by lowering the legs onto leg rest 16, so that it is unnecessary to provide the conventional latches, detents, cranks, etc., to accomplish this result. To adjust the chair rearwardly to a different position, the user or operator merely maintains his legs or feet out of engagement with leg rest 16, grasps the chair arms 18 and pushes to effect shifting of rails 34 along rollers 32. The chair then naturally adjusts in a shifting pivot operation to the desired position and may be again locked merely by lowering the legs. It is to be understood that the center of gravity of the chair and occupant is to the rear of the pivot point after substantial inclination is achieved, so that the chair will then pivot rearwardly unless locked as described.

Proceeding now to a description of the structure and operation of the head rest 17, and referring particularly to Figures 2, 5, and 6, a pair of hinges 66 is suitably connected to the forward edges of cross boards 44 and 46 which are incorporated, respectively, in chair back 15 and head rest 17 as previously indicated. Hinges 66 permit forward pivoting of the main upholstered portion of the head rest relative to the chair back, which pivoting is preferably opposed by engagement and compression of the chair padding as best shown at 67 in Figure 5. The forward surface of head rest 17 is substantially in line with that of chair back 15 when the chair is in its upright position, shown in Figure 2, but may be shifted to the head-supporting angle shown in Figure 5 when the chair is inclined.

To lock the head rest in various pivoted positions, a locking or latch means 69 is provided at the mid-portions of cross boards 44 and 46. The locking means comprises a notched bar 71 mounted in a slot 72 in cross board 46, there being suitable brackets 73 secured in slot 72 to support a pivot pin or rivet 74 which extends through the upper end of bar 71 to form a freely pivoted connection. Bar 71 hangs downwardly through a slot 76 in cross board 44 for engagement with a horizontal detent bar 77 mounted over the upper rearward portion of slot 76. The inner edge of detent bar 77 selectively engages two saw-tooth notches 78 and 79 in the rearward edge of bar 71, the upper edges of the notches being substantially perpendicular to the longitudinal axis of the bar.

In the operation of the locking mechanism 69, bar 71 hangs vertically when chair back 15 is upright, as shown in Figure 2, and is then out of engagement with detent 77. It follows that the grasping of head rest 17 to pivot it forwardly at this time will not effect locking of the head rest, since bar 71 may not engage the detent when the chair back is vertical. However, upon adjustment of the chair to an inclined position such as is shown in Figures 3, 4, and 5, bar 71 swings into engagement, above upper notch 78, with the inner edge of detent 77. Upon subsequent forward pivoting of the head rest, the bar 71 will pivot over detent 77 as soon as notch 78 rides upwardly over the detent. The head rest 17 is thus locked in a slightly inclined position relative to back 15, since return movement is prevented by the transverse upper edge of notch 78 pressing against detent 77. To adjust head rest 17 to a second inclined position, the head rest is grasped to pivot it forwardly until bar 71 rides upwardly relative to the detent and notch 79 swings into locking position as shown in Figure 5. The head rest will then remain in the locked position shown in Figure 5 since return movement is prevented by registry of detent 77 and notch 79 and further forward movement is opposed by engagement at 67 of the head rest and chair back padding means. To again adjust head rest 17 to the retracted position shown in Figure 2, it is merely necessary to adjust the chair to the upright position (Figure 2) and then manually pivot head rest 17 forwardly to free notch 79 from detent bar 77, the bar 71 then pivoting under the effect of gravity to a vertical position out of

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engagement with the detent. The head rest may then be pivoted to retracted position without engagement of the notched edge of bar 71 with detent 77.

To briefly summarize the operation of the above embodiment, let it be assumed that the chair is in the upright position of Figure 2. It is then merely necessary for a person sitting in the chair to extend his legs forwardly, grasp the upper edges of arms 18, and press against them to move the seat and back of the chair rearwardly. The rails 34 then ride rearwardly on rollers 32 to shift the center of gravity of the chair and pivot it to the desired inclined position. When it is desired to hold the chair in reclining position, the operator merely lowers his legs onto leg rest 16 to frictionally lock brake band 57 against friction element 56. Should it be desired, when the chair is in any substantially inclined position, to provide additional head-lifting support, the operator merely reaches back over the upper edge of head rest 17 and pulls to pivot it to a forwardly locked position. To lift himself out of the chair, or to adjust the chair to a vertical position, the operator merely pulls on the upper forward edges of chair arms 18. The rails 34 then ride forwardly on rollers 32 to the position of Figure 2 at which the leg rest 16 is in vertical nested position and the movement of the chair is stopped on the upper ends of posts 26. The head rest 17 may then be readily retracted merely by pulling it a slight distance forwardly and then either letting go or pressing rearwardly depending upon the amount of resilience in the padding of the particular chair. The chair may thus by natural movements of the arms and legs be easily adjusted to any number of positions between upright and the extreme inclined position of Figure 4, at which notched portion 24 of the chair back is stopped by rubber stop element 23. It is never necessary for the operator to grasp or manipulate any mechanical contrivance such as a detent or shifting lever of the type conventionally provided on reclining contour chairs presently known.

Referring now to Figures 9, 10, and 11, a second embodiment of the invention is adapted for use as a patio or porch chair as distinguished from the upholstered chair previously described. As in the case of the previous embodiment, the patio or porch chair comprises a cradle support 81, a chair-supporting cradle 82, an integral chair seat and chair back 83 and 84, and a pivoted foot or leg rest 85. However, a different relationship of parts is presented in that the cradle support 81 does not serve as the arms of the chair, this function being instead performed by the cradle 82.

The cradle support 81 is preferably formed of cylindrical metal rods welded into an elongated rectangle and then bent at an acute angle, so that end portions 86 of the rectangle serve as ground-engaging elements. Suitable longitudinal and transverse brace rods 87 and 88 are then welded around the lower portion of the cradle support to provide a rigid bracing structure and to serve as mounting means for linkages to be described subsequently. A grooved roller 89 is freely journaled in each apex 90 of cradle support 81 by means of a bolt 91 threaded into a block 92, the latter being suitably welded to the cradle support side portions. The portion of each apex 90 above roller 89 serves, similarly to each chair arm 18 of the previous embodiment, as a stationary element to be grasped by the user in order to adjust the chair to various positions.

The chair cradle 82 is formed as in the previous embodiment with rails 93 integral with connecting rods 94 and 95 leading, respectively, to the seat and back portions 83 and 84 of the chair. In addition to the connecting rods 95 leading to the chair back 84, and which correspond to connecting portions 36 of the first embodiment, suitable brace members 97 are welded between rails 93 and back 84 to form a strong truss relationship. This construction is employed because of the fact that the cradle 82 is welded directly to the corresponding chair

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components instead of being formed with horizontal support bars such as bars 38 and 39 previously described. A guard 98 is welded between the respective rods 94 and 95 in a position preventing the cradle from being lifted off rollers 89.

Chair back 84 and seat 83 are preferably formed of a unitary metal frame, for example welded cylindrical rods or tubing. The frame may be employed to support any suitable type of fabric or metal webbing, for example the single piece 99 of canvas or other fabric shown in Figures 9 and 10. Foot or leg rest 85 is pivotally connected at 101 to the forward portion of chair seat 83 and may comprise a single piece of wood or metal. The means for automatically elevating leg rest 85 during inclination of the chair, and for locking the chair in its various adjusted positions, comprises a pair of linkages 102 and 103 spaced inwardly from the edges of the chair as shown in Figure 11. Each linkage includes a pivot support bar 104 welded vertically of the frame of chair seat 83 and pivotally connected at its lower end to the mid-portion of a friction lever 106. Lever 106, which may comprise two spaced riveted bars, is pivotally connected at its inner end to a rigid metal actuating link 107, the link 107 in turn being pivotally connected to a suitable lug 108 welded to the forward transverse frame bar 88.

The friction means associated with each linkage 102 and 103 to effect locking of the chair in its various positions comprises a curved friction element 109 welded to the outer end of the friction lever 106 and cooperating with a rubber or fabric brake band 111 secured to the underside of the leg rest 85. As in the previous embodiment, the chair may be locked against rearward pivoting by lowering the legs onto leg rest 85 to prevent sliding of friction element 109 along brake band 111.

The operation of the chair of Figures 9-11 is substantially the same as that of the first described form of the invention. When the chair is in the upright position, shown in Figure 9, rollers 89 are supporting the bent connections between rails 93 and connecting rods 95, and any forward pivotal movement is prevented by engagement of the pivotally connected end portions 112 of lever 106 and link 107 with the rear edge of pivot support bar 104. To adjust the chair to an inclined position, the apex portions 90 of cradle support 81 are grasped and pressure is applied to cause rearward travel of rails 93 along the rollers 89, with the legs being held off the ground and free of leg rest 85. The leg rest 85 then pivots upwardly due to operation of linkages 102 and 103 as in the previous embodiment, and the chair may be locked merely by lowering the legs. When the chair is in the extreme reclining position shown in Figure 10, rollers 89 engage the bent connections between rails 93 and connecting rods 94, and the linkages 102 and 103 tend to prevent any further tilting movement. To again shift the chair forwardly to the position of Figure 9, the legs are elevated and the upper apex portions 90 of cradle support 81 pulled to shift rails 93 forwardly on the rollers 89 and to their initial position.

While the particular apparatus herein shown and described in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

I claim:

1. In a reclining chair construction, a cradle support, a cradle pivotally and slidably supported on said cradle support, a rigidly connected chair back and chair seat supported by said cradle for adjustment to a substantial number of upright and reclining positions depending upon the pivoted position of said cradle relative to the cradle support, a leg rest pivotally secured to the forward

portion of the chair seat, linkage means operably associated with said chair back and seat to pivot said leg rest to an extended position during pivoting and sliding of the chair back and seat to a reclining position, said linkage means including a lever having one end adapted to slide along the underside of said leg rest during pivoting of the chair back and seat, and friction means operated by a downward pressure on the leg rest to lock said one lever end against sliding movement relative to the leg rest and thereby to maintain the chair back and seat against rearward tilting in a selected reclining position.

2. A device as set forth in claim 1, wherein said linkage and friction means comprise a pivot support on the underside of said chair seat, a friction surface provided on the underside of said leg rest, said lever being pivotally connected at its mid-portion to said pivot support, and an actuating link connecting the other end of the lever to a stationary component of the chair, whereby pivoting of the chair back and seat to a reclining position operates to elevate the pivot support and pivot the friction lever for actuation by the leg rest to an extended position.

3. A device as set forth in claim 2, wherein said actuating link is formed of flexible material.

4. A device as set forth in claim 2, wherein the actuating link is a rigid rod, forward movement of the chair back and seat causing the pivotally joined ends of the lever and link to move into engagement with the pivot support to stop the chair back and seat in extreme upright position.

5. In a reclining chair construction, a cradle support, a cradle, shifting pivot means to suspend the cradle from the said cradle support, a unitary chair back and seat supported on the cradle, the chair back and seat being adjustable through operation of said shifting pivot means to an infinite number of upright and reclining positions having different centers of gravity, a leg rest pivotally secured to the forward portion of the chair seat, linkage means operably associated with the chair back and seat to pivot the leg rest to an extended position during pivoting of the back and seat to a reclining position, said linkage means including a link having one end engaging and adapted to slide along the underside of the leg rest during pivoting of the chair back and seat, and friction means operated by a downward pressure on the leg rest to lock said one link end against sliding relative to the leg rest and thus maintain the chair back and seat in a selected reclining position.

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