

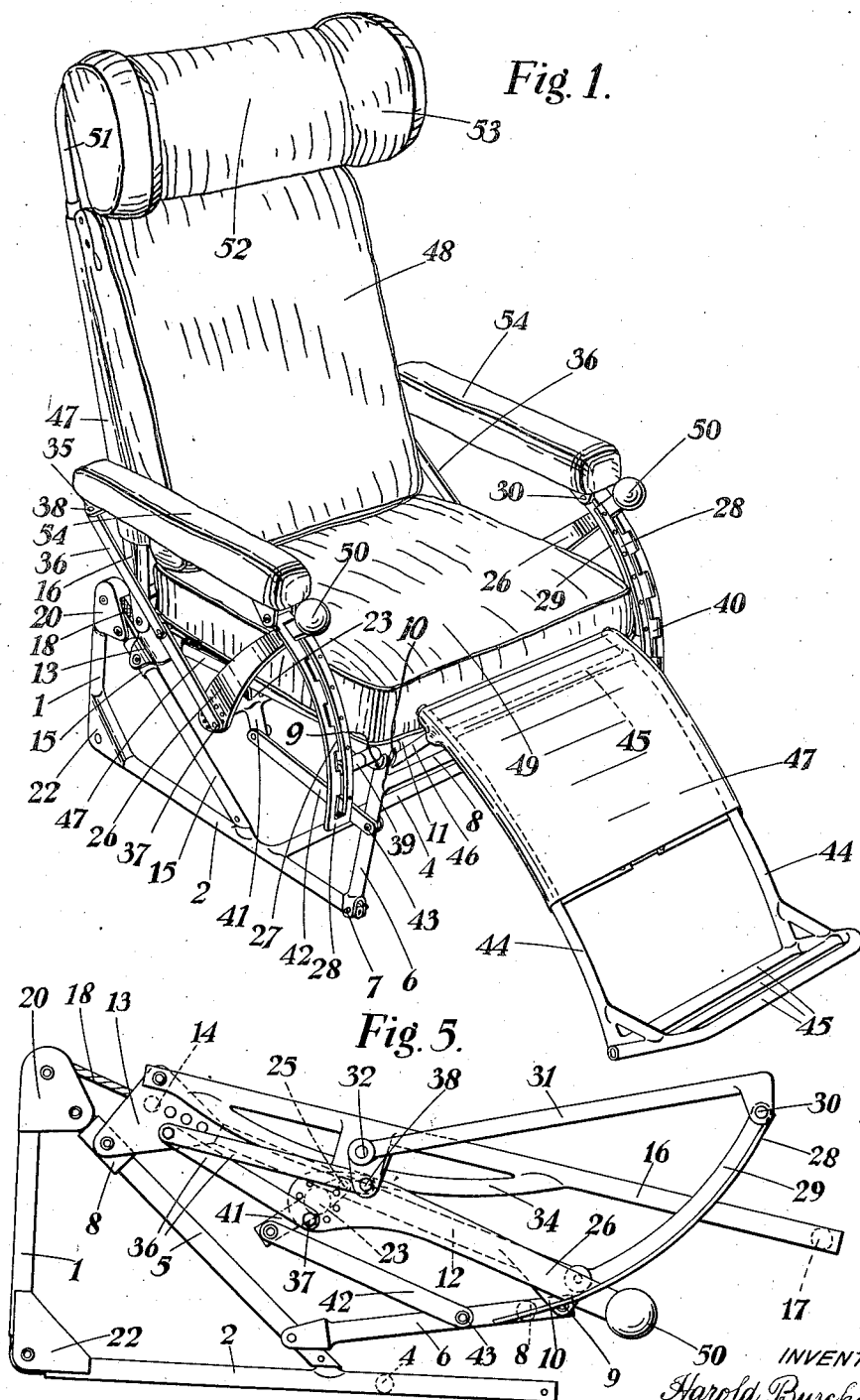
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H. BURCHALL
PORTABLE ADJUSTABLE CHAIR

Filed Nov. 6, 1935

2,132,525

4 Sheets-Sheet 1



50 INVENTOR
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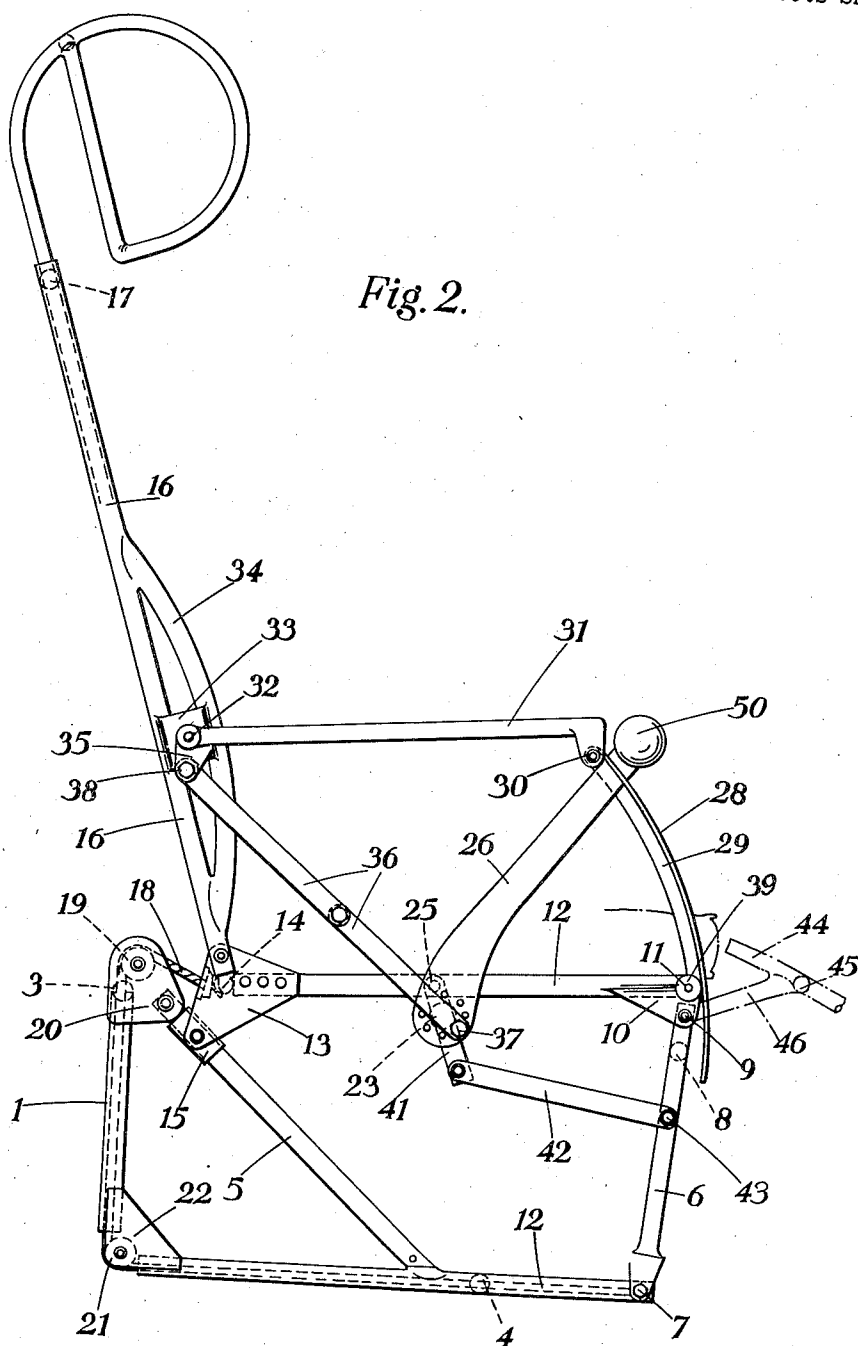
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Fig. 2.



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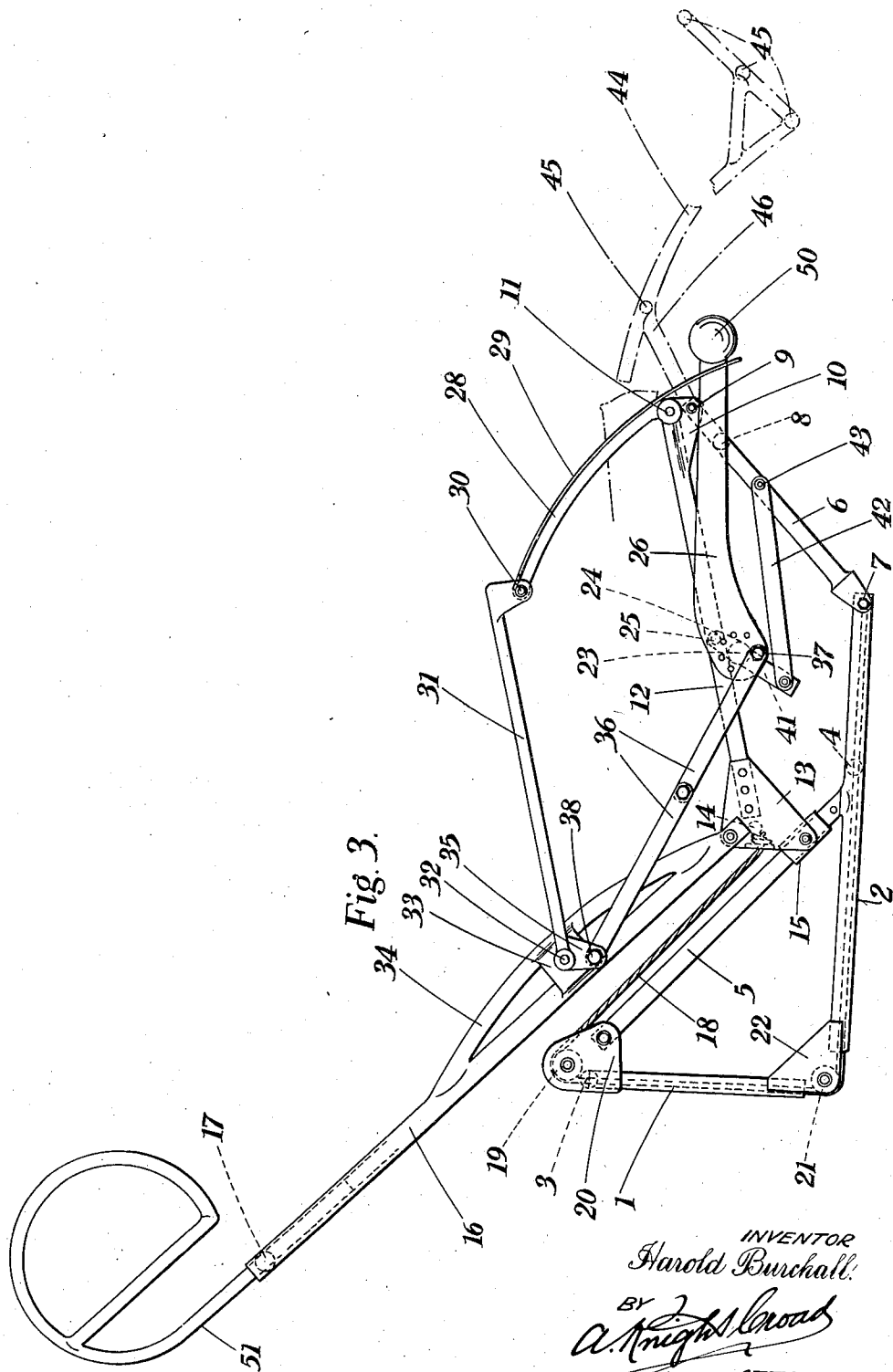
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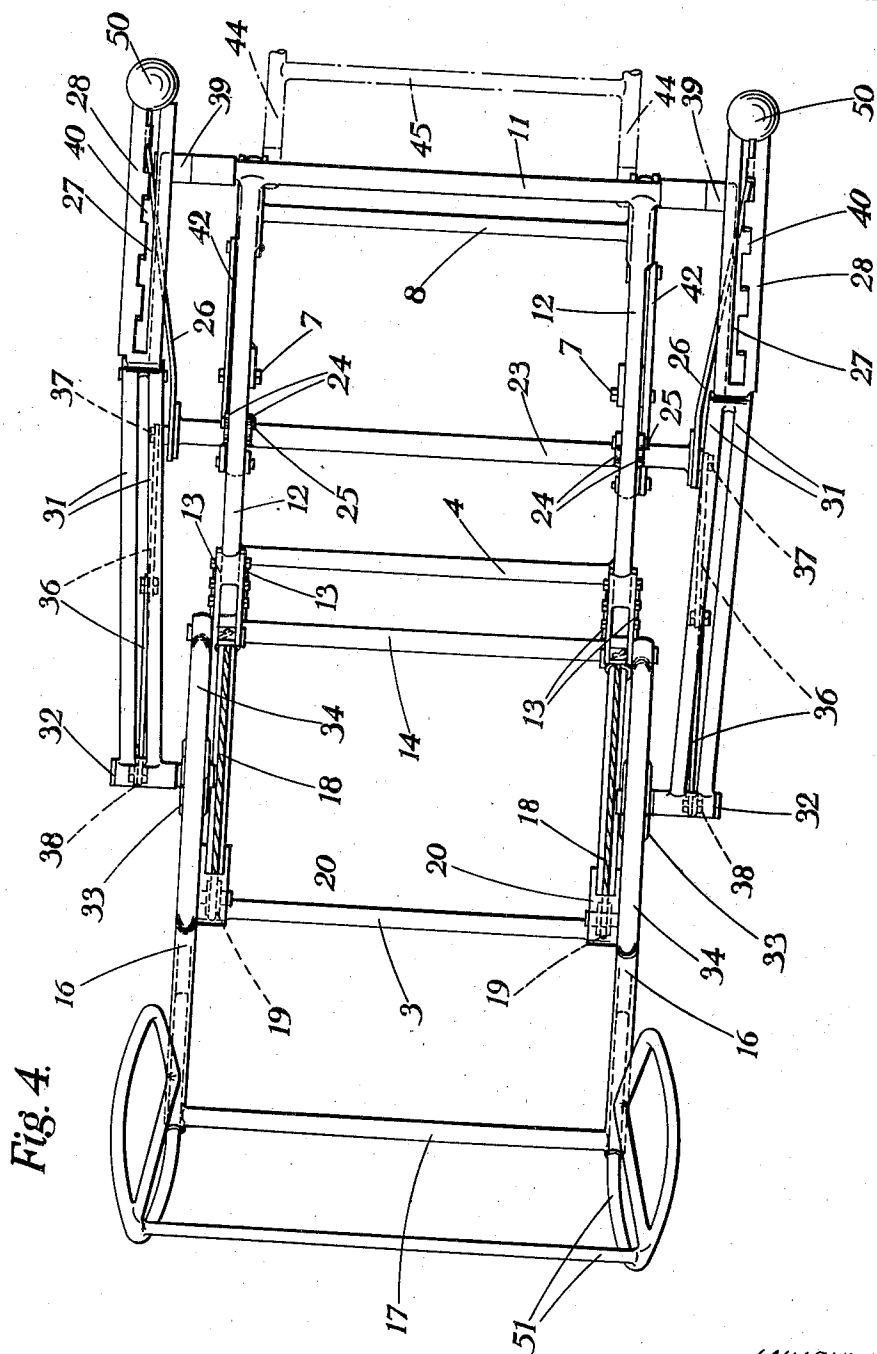
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UNITED STATES PATENT OFFICE

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PORTABLE ADJUSTABLE CHAIR

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In Great Britain November 13, 1934

6 Claims. (Cl. 155-116)

This invention relates to portable adjustable chairs and it has for its objects the construction of a chair (a) which will enable same to be used so that the user may sit in an approximately upright position or in an approximately full reclining position or any desired position intermediate these two maximum positions, the change of position, either up or down, being effected by the user without rising from the chair by the operation of a control device; (b) in which the centre of gravity of the chair and its occupant remains within the base of the chair irrespective of the position of its component parts, thereby avoiding any tendency for the chair to tip in any direction throughout the range of its adjustment; (c) in which, as the inclination of the back is increased, the entire seat and the back are both lowered towards the floor, thereby enabling the legs of the occupant to assume a more natural attitude in all positions, that is, when the chair is in the upright position the legs from the knees downward are in a more or less vertical position, but as the chair is gradually lowered into the lowest position the legs more nearly approach a horizontal position; (d) in which, irrespective of any adjustments that may be made in the position of the seat and back of the chair, the base does not vary and can be rigidly fixed to the floor; and (e) in which the chair may be folded so as to occupy a space approximately equal to the height of the rigid frame.

To attain these ends the chair comprises a rigid framework, vertically disposed supporting members hinged to the front of the rigid frame, a seat frame pivoted to said vertically disposed supporting members, the rear part of said seat frame being arranged to slide on a runway forming part of or secured to the rigid frame, a back frame pivoted adjacent its lower end to the rear of the seat frame; means for adjusting said seat and back frames relatively to the rigid frame and means for controlling and/or releasing the adjusting means when it is desired to vary the position of the seat and back frames and means yieldingly connecting the rear end of said seat frame with the rigid frame serving to balance the weight of the moving parts and of the occupant, and also to assist in returning said moving parts to a higher and to normal position when the adjusting means are released.

In the accompanying drawings which illustrate one embodiment of the invention:—

Figure 1 is a perspective view of a chair complete with leg rest and cushions;

Figure 2 is a side elevation, with the cushions removed, of a chair in the normal or erect position;

Figure 3 is a similar view to Figure 2 showing the chair in the extreme extended position;

Figure 4 is a plan of Figure 3, and,

Figure 5 is a similar view to Figure 2 showing the chair in the folded position.

Referring to the drawings, in the embodiment illustrated the various frame sections are built up of tubular members, both sides of the chair are identical in construction and comprise two rigid L-shaped frames, each of which is composed of two members 1 and 2, the upper ends of the vertical members 1 are connected and spaced apart by a transverse member 3 and the horizontal members 2 are connected and spaced apart by a transverse member 4. The vertical and horizontal members 1 and 2 of each side frame are also stayed by a member 5 arranged at about 42°, which stay member also forms a ramp for the purpose hereafter described. A vertical member 6 is connected by pivot pins 7 to each of the front ends of the horizontal members 2 and to each other by a transverse member 8. The extreme upper end of each of the members 6 is pivoted at 9 to a bracket 10 secured to a rectangular horizontally disposed frame comprising a transversely disposed member 11, and a pair of side members 12, each of which is rigidly connected at its front end to the transverse member 11 and at its rear end to a pair of triangular plates 13, the two pairs of plates being spaced apart and connected to each other by a transverse member 14. A short tubular member 15 is pivotally mounted between each of the pairs of plates 13, said member 15 being arranged to slide on the angularly disposed member 5.

The back frame comprises two vertically disposed members 16, the extreme lower ends of such members are pivotally connected to the plates 13. The upper ends of the vertical members 16 are spaced apart and connected together by a transversely disposed member 17.

For the purpose of controlling the rise and fall of the seat and back frames, one end of an elastic cord 18 (composed of a plurality of strands of India-rubber suitably braided) is secured, as shown in Figure 3, between the plates 13 secured to the rear end of each of the side members 12 of the seat frame, each of said cords being carried upwardly and rearwardly over a pulley 19 mounted between a pair of plates 20 to which the upper ends of the vertical members 1 and the upper ends of the vertical members 5 are rigidly connected, each of said cords pass downwardly through the tubular vertical members 1 around a pulley 21 mounted between a pair of plates 22 to which the lower ends of the vertical members 1 and the rear ends of the horizontal members 2 are rigidly connected, and through said members 2 to the front ends thereof where they are anchored in any convenient manner, such as by looping the end of the cord or a part secured thereto around the pivot pin connecting the members 2 and 6.

The means for adjusting and locking the seat frame in any desired position comprises a cross-shaft 23 provided adjacent each end with a pair of lugs 24 by means of which said shaft is rockably mounted at 25 on the side members 12 of the seat frame; on each end of the cross-shaft 23 is secured a lever 26 arranged to slide in slots 27 provided in plates 28 secured to quadrants 29, the upper ends of which are hingedly connected at 30 to members 31 constituting the arm rests for the chair; the rear ends of said arm rest members 31 are pivotally connected at 32 to a part 33 secured to or formed integrally with the vertical members 16 of the back frame which at this point are preferably provided with a second tubular member 34 as shown, and the ends of the levers 26 adjacent the cross-shaft 23 are connected to parts 35 on the rear ends of the arm rest members 31 by a pair of jointed links 36 pivoted to the levers 26 and parts 35 at 37 and 38 respectively. The lower ends of the quadrants 29 are hingedly connected at 39 to the front transverse member 11 of the seat frame. Suitable means are provided for locking the levers 26 relatively to the quadrant plates 28 and thereby the seat and back frame in any desired position, and, as shown, one edge of the slots 27 in the quadrant plates 28 is provided with notches 40 in which the levers 26 adjacent the operative ends thereof are caused to engage, as shown clearly in Figure 1. The cross-shaft 23 is further provided at each end with a downwardly depending member 41, the lower ends of which are connected by links 42 to the vertically disposed members 6 at 43.

The chair may, if desired, be provided with a removable leg and foot rest composed of a pair of side members 44 spaced apart and connected together by a plurality of transversely disposed members 45; the upper ends of the side members 44 are provided with short members 46 adapted to be removably attached by the pivot pins 9 to the upper ends of the members 6.

The spaces between the vertical side members 16 of the back frame, the side members 12 of the seat frame and the side member 44 of the leg rest may be filled in with canvas or like material 47 stretched taut by lacing or other means, thereby constituting a suitable support for the back and seat cushions 48 and 49 respectively and for the back of the legs in the case of the foot rest.

In use, assuming the seat of the chair to be in its highest position, that is, practically horizontal as shown in Figure 1, and that the person sitting thereon desires to rest in a more reclined position, the sitter takes hold of the knobs 50 on the operative ends of the levers 26, pulls same slightly inwardly and thereby re-releases said levers from the locking notches 40 in the quadrant plates 28; the levers may then be pushed forwardly and downwardly; the seat will then lower gently against the pull of the elastic cords, the action of said cords being balanced by the pressure on the handles and the weight of the occupant. When the desired position has been reached; for example, the extreme position shown in Figure 3, the sitter releases the levers 26 which due to the lateral bending of the levers instantly engage the locking notches 40 in the quadrant plates 28 thereby locking the seat and connected parts in the desired position. To return the seat to the highest position, or to a position intermediate the highest or lowest, the sitter releases the levers 26 from the locking notches 40 and pulls

said levers towards him, at the same time pushing gently on the floor with his feet.

When it is desired to fold the chair, the pins or pivots 7 connecting the lower ends of the front vertical members 6 with the front ends of the horizontal members 2 of the rigid frame are withdrawn and the vertical members 6 are then pushed inwardly and rearwardly, while the adjusting levers 26 are released from the notches 40 in the quadrant plates 28. The back frame 16 is then drawn down between the arm rests 31, the total height of the folded chair, as shown in Figure 5, being but slightly more than the height of the rigid frame.

It will be understood that if desired the framework of the chair may be arranged to support two or more seats and said seats may be separately or independently controllable, or may be arranged to act in unison with each other.

It will be obvious that the several frame sections may be formed in ways varying from that above described without departing from the essential characteristics of the invention according to the use to which the chair is to be put. Further, the back frame of the chair may be provided with a frame 51, the downwardly directed members of which are slidably arranged in the vertical members 16, being retained in any desired position by friction, adapted to support a head rest or pillow 52 with or without side wings 53 and the arm rest members 31 are preferably provided and provided with removable covers 54.

What I claim is:—

1. A portable adjustable chair comprising in combination a rigid frame, vertically disposed supporting members pivoted at their lower ends to the front of said rigid frame, a seat frame pivotally connected to the upper ends of said vertically disposed supporting members, means pivotally mounted on the rear ends of said seat frame slidably connecting said seat frame with an inclined member of the rigid frame, a back frame pivoted at its lower end to the rear of the seat frame, means for adjusting said seat and back frames relatively to each other and vertically with respect to the rigid frame, means for securing said adjusting means and thereby the adjustable parts of the chair in any desired position, and means yieldingly connecting the rear end of said seat frame with the rigid frame serving to balance the weight of the moving parts and the occupant while the relative position of the parts is being changed and also to assist in returning said moving parts to a higher and to a normal position when the adjusting means is released, the lower ends of the vertically disposed supporting members being detachable from the front end of the rigid frame so as to permit the back frame to be folded down on to the top of the seat frame.

2. A portable adjustable chair comprising in combination a rigid frame, inclined ramps provided on said frame, vertically disposed supporting members detachably pivoted at their lower ends to the front of said rigid frame, a seat frame pivotally connected to the upper ends of said vertically disposed supporting members and slidably arranged at its rear on said ramps, a back frame pivoted adjacent its lower end to the rear of the seat frame, means for adjusting said seat and back frames relatively to each other and vertically with respect to the rigid frame, means for securing said adjusting means and thereby the adjustable parts of the chair in any desired position, means yieldingly con-

necting the rear end of the said seat frame with the rigid frame serving to balance the weight of the moving parts and the occupant while the relative position of the parts is being changed and also to assist in drawing the seat frame upwardly and rearwardly up said inclined ramps and in returning said moving parts to a higher and to a normal position when the adjusting means is released, and means for supporting cushions on said seat and back frames.

3. A portable adjustable chair comprising in combination a rigid frame, inclined ramps secured to said frame, vertically disposed supporting members pivoted to the front of said frame, a seat frame pivoted to the upper ends of said vertically disposed supporting members and slidably arranged at its rear end on said ramps, a back frame pivoted adjacent its lower end to the rear of the seat frame, means providing an elastic connection between the seat frame and the rigid frame comprising an elastic cord arranged on each side of the chair connected to the seat frame and rigid frame, quadrant members pivoted at their lower ends to the front end of the seat frame, arm rest members pivoted at their rear ends to the back frame and at their front ends to the upper ends of the quadrant members, a laterally extending plate secured to each of said quadrant members, a longitudinally disposed slot provided in each of said plates, a plurality of stops provided in one edge of each of said slots, means for adjusting said seat and back frames relatively to the rigid frame comprising a cross-shaft secured to parts rockably mounted on the seat frame, a lever secured to each end of said cross-shaft, the operative ends of said levers being arranged to slide in the slots formed in the plates secured to the quadrant members and to coact with the stops provided therein, jointed links connecting the lower ends of said levers with the back frame, a downwardly directed member provided adjacent each end of said cross-shaft and links connecting said downwardly directed members to the vertically disposed supporting members.

4. A portable adjustable chair comprising in combination a pair of rigid side frames, an inclined ramp secured to each of said frames, a vertically disposed supporting member pivoted to the front of each side frame, a plurality of transversely disposed members rigidly connecting said side frames and supporting members, a rectangular seat frame pivoted to the upper ends of said vertically disposed supporting members and slidably arranged at its rear end on said ramps, a rectangular back frame pivoted adjacent its lower end to the rear of the seat frame, means yieldingly connecting the rear end of said seat frame with the rigid frame comprising an elastic cord arranged on each side of the chair connected to the seat frame and a rigid side frame, quadrant shaped members pivoted at their lower ends to the front end of the seat frame, arm rest members pivoted at their rear ends to the back frame and at their front ends to the upper ends of the quadrant shaped members, a curved laterally extending plate secured to each of said quadrant shaped members, a longitudinally disposed slot provided in each of said plates, a plurality of stops provided in each of said slots, means for adjusting said seat and back frames relatively to the rigid frame comprising a cross-shaft secured to parts rockably mounted on the seat frame, a lever secured to

each end of said cross-shaft, the operative ends of said levers being arranged to slide in the slots formed in the plates secured to the quadrant shaped members and to coact with the stops provided therein, jointed links connecting the lower ends of said levers with the back frame, a downwardly directed member secured adjacent each end of said cross-shaft and links connecting said downwardly directed members to the vertically disposed supporting members.

5. A portable adjustable chair comprising in combination a rigid frame, inclined ramps secured to said frame, vertically disposed supporting members pivoted at their lower ends to the front of said frame, a seat frame pivoted to the upper ends of said vertically disposed supporting members and slidably arranged at its rear end on said ramps, a back frame pivoted adjacent its lower end to the rear of the seat frame, means comprising an elastic cord arranged on each side of the rigid frame yieldingly connecting the rear end of said seat frame with the rigid frame, quadrant members pivoted at their lower ends to the front transverse member of the seat frame, arm rest members pivoted at their rear ends to the back frame and at their front ends to the upper ends of the quadrant members, a laterally extending plate secured to each of said quadrant members, a longitudinally disposed slot provided in each of said plates, a plurality of stops provided in each of said slots, means for adjusting said seat and back frames relatively to the rigid frame comprising downwardly directed lugs rockably mounted on the side members of the seat frame, a cross-shaft secured to said lugs, a lever secured to each end of said cross-shaft, the operative ends of said levers being arranged to slide in the slots formed in the plates secured to the quadrant members and to coact with the stops provided therein, jointed links connecting the lower ends of said levers with the back frame, a downwardly directed member secured adjacent each end of said cross-shaft and links connecting said downwardly directed members to the vertically disposed supporting members.

6. A portable adjustable chair comprising in combination a rigid frame, vertically disposed supporting members connected at their lower ends to the front ends of said rigid frame, a seat frame pivoted to the upper ends of said vertically disposed supporting members and slidably arranged at its rear end on inclined members on said rigid frame, a back frame pivoted to the rear of the seat frame, means for adjusting said seat and back frames relatively to each other and vertically with respect to the rigid frame, means for securing the adjusting means and thereby the adjustable parts of the chair in any desired position, means yieldingly connecting the rear end of said seat frame with the rigid frame serving to balance the weight of the moving parts and the occupant while the relative position of the parts is being changed and also to assist in returning the chair to normal position when the adjusting means is released, and removable pins connecting the vertically disposed supporting members to the rigid frame so that when the pins are removed the lower ends of said supporting members may be pushed rearwardly and the back frame folded down on to the top of the seat frame.

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