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ADJUSTABLE PILOT CHAIR

Filed June 16, 1950 2 Sheets-Sheet 1

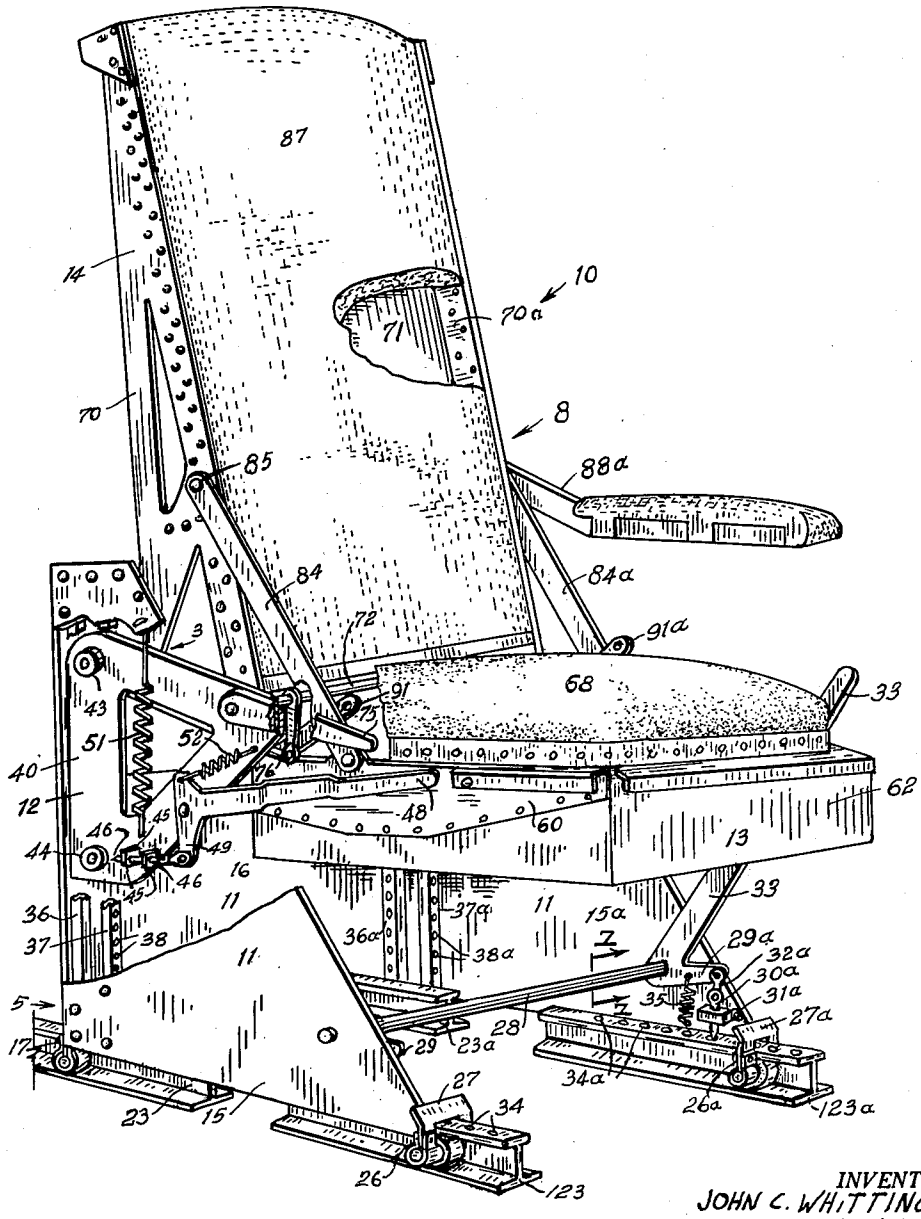


FIG. 1

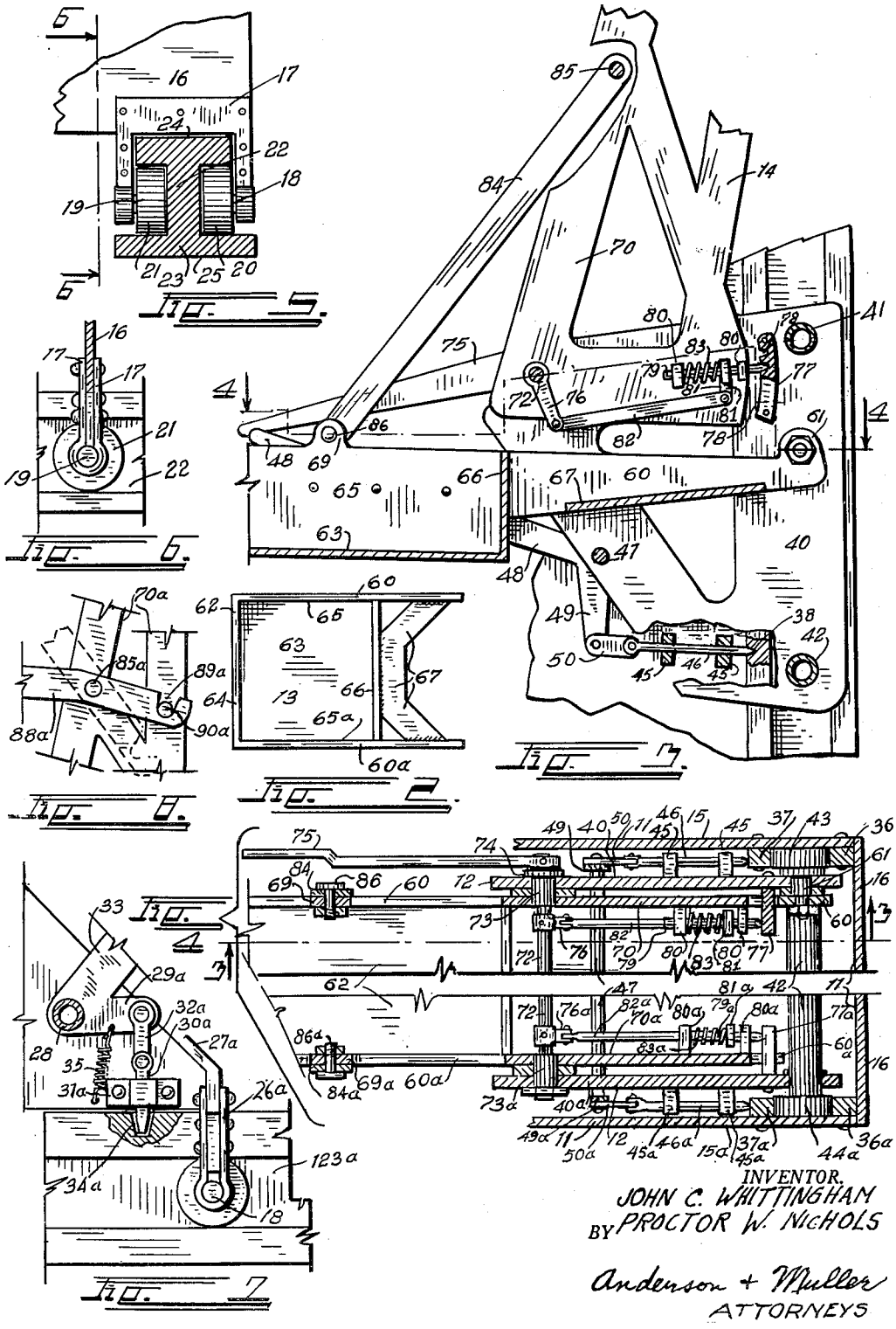
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ADJUSTABLE PILOT CHAIR

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18 Claims. (Cl. 155—14)

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This invention relates to improvements in adjustable chairs for use in aircraft, locomotive engines, busses, passenger coaches, or other places wherein adjustable chairs are desired.

One of the objects of the invention is to provide a chair which may be readily adjusted to conform with the most comfortable and optimum seating position of the user.

Another object is to provide an improved chair having an angularly adjustable seat and back rest mounted on a vertically adjustable seat and back rest carrier, the carrier being supported by a horizontally adjustable frame.

Another object is to interconnect the seat and back rest in a manner such that one moves through a predetermined angle in response to movement of the other.

Further objects, advantages, and salient features will become more apparent from a consideration of the description to follow, the appended claims, and the accompanying drawing, in which:

Figure 1 is a perspective of the chair which forms the subject of the invention, portions being broken away to show certain internal parts;

Figure 2 is a top plan view to reduced scale of the seat component, the cushion being removed;

Figure 3 is an enlarged section taken on line 3—3, Figure 4, portions being broken away;

Figure 4 is a section taken on line 4—4, Figure 3, portions being broken away;

Figure 5 is an enlarged detail as viewed in the direction of arrow 5, Figure 1;

Figure 6 is a section taken on line 6—6, Figure 5;

Figure 7 is an enlarged section taken on line 7—7, Figure 1, a portion being broken away; and

Figure 8 is a detail as viewed in the direction of arrow 8, Figure 1.

Referring in detail to the drawing, and particularly Figure 1, the chair is designated in its entirety by reference numeral 10, the principal components thereof being a frame 11, a seat and back rest carrier 12, a seat 13, and a back rest 14.

Frame 11 comprises a pair of general triangular parallel spaced side plates 15, 15a connected together at their rear vertical edges by a transverse plate 16, connection being effected by welding, rivets or any well-known fastening means. A bifurcated bracket 17 (see Figures 5 and 6) is riveted to plate 16 at each lower corner thereof, each bracket carrying pins 18, 19, the ends of which support rollers 20, 21 which are disposed on opposite sides of the web 22 of an I beam rail

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23 having upper and lower flanges 24, 25, respectively. An identical construction is employed for engaging the other I beam 23a. A similar construction is employed at the lower front corners of side plates 15, 15a, the roller carrying brackets 26, 26a being secured to plates 27, 27a, respectively, welded to the side plates. The rollers carried by these brackets similarly engage I beam rails 123, 123a. A torque shaft 28 extends between the side plates, being journaled in the latter at its ends, and has secured thereto arms 29, 29a. As shown for one side in Figures 1 and 7, arm 29a is connected to a latch pin 30a, slideable in block 31a, by a link 32a pivotally connected at its ends to the top of the latch pin and end of the arm. An identical construction is employed at the left end of shaft 28 in Figure 1. A lever 33 is connected to the shaft and a plurality of tapered apertures 34, 34a are provided in the top faces of the rails into which the tapered ends of pins 30, 30a engage. A spring 35 retains the pins in the apertures in the rails, and when it is desired to adjust the frame along the rails, lever 33 is actuated, releasing the latch pins, the entire chair bodily moved to a desired position, and the lever released to permit the latch pins to again enter the apertures. Pairs of vertically extending parallel spaced guide rails 36, 37 and 36a, 37a are secured to side plates 15, 15a, respectively, on their inside surfaces, adjacent the intersection of the side plates and cross plate as shown in Figures 1 and 4. The front guides 37, 37a, are provided with a plurality of spaced tapered apertures 38, 38a, respectively, in the front surfaces thereof which serve a purpose to be subsequently described.

The carrier 12, previously referred to, comprises a pair of plates 40, 40a secured together in parallel spaced relation by an upper spacer tube 41 and a lower spacer tube 42, the tubes being welded or otherwise secured to the plates. The left ends of tubes 41, 42, as viewed in Figure 1, carry rollers 43, 44, respectively, and the right ends carry identical rollers, the lower one of which is shown at 44a in Figure 4. These rollers engage between the vertical guide rails, previously described, and permit the carrier 12 to be adjusted vertically relative to frame 11. Latch pin supporting brackets 45, 45a are secured to side plates 40, 40a, respectively, which slideably receive latch pins 46, 46a, respectively, which selectively engage apertures 38, 38a, respectively, in the forward vertical guide rails. A torque shaft 47 extends between the side plates, and is journaled therein, which has affixed thereto at

the left end (Figure 1) a lever 48 having an arm 49 thereon which is operatively connected to latch pin 46 by a link 50. The other end of torque shaft 47 has affixed thereto an arm 49a which is connected to latch pin 46a by a link 50a. A spring 51, as shown in Figure 1, has its lower end secured to plate 40 and its upper end to plate 15 to urge the former upwardly, an identical spring (not shown) being employed at the other side of the chair. A spring 52 urges latch pins 46, 46a into engagement with apertures 38, 38a, respectively. The spring 51 and the corresponding spring on the opposite side of the chair are so tensioned that when the user removes his weight, or a portion thereof, from seat 13, the carrier 12 will automatically move upwardly after the latch pins have been released, and when a desired position is reached the pilot releases lever 48 to latch the carrier 12 to the frame 11.

The seat 13 comprises a pair of seat supporting arms 60, 60a which are pivoted at their rear ends to plates 40, 40a, respectively. As shown in Figure 3, and the upper portion of Figure 4, a pivot pin 61 is shown to effect this connection, it being understood that an identical pin is employed on the other arm, but which is not shown in the lower portion of Figure 4 since arm 60a and its associated pivot pin are broken away to show the lower tube 42. The seat supporting arms are secured together by and support a seat cushion frame 62 comprising a bottom 63, front wall 64, side walls 65, 65a, and a rear wall 66. The rear wall is braced to the arms by a gusset brace 67, as best shown in Figures 2 and 3. The cushion frame receives any suitable padded cushion 68. The side frames 60, 60a are provided with apertured lugs 69, 69a, respectively, which serve a purpose to be subsequently described.

The back rest 14 comprises side frames 70, 70a secured together in spaced parallel relation by a sheet metal back plate 71 which is channel shaped, the side flanges of the channel being riveted or otherwise secured to the side frames. A torque shaft 72 extends between plates 40, 40a and the lower ends of frames 70, 70a are pivoted for movement about the axis of this torque shaft. As shown in Figure 4, a suitable flanged bushing 73 is secured to plate 40 by nut 74, the inner end of the bushing providing a pivot for frame 70. An identical bushing 73a is provided on the other side of the chair, and these bushings rotatably support torque shaft 72. One end of torque shaft 72 has affixed thereto a lever 75 and the torque shaft also has affixed thereto a pair of arms 76, 76a. Quadrants 77, 77a are affixed, respectively, to plates 40, 40a, these quadrants having spaced tapered holes 78 therein similar to those employed with the other latch pins described. These quadrants are approximately 25–30 degrees long, but the one seen in Figure 3 is broken away slightly at its lower end. Latch pins 79, 79a are slideably supported by ears 80, 80a, affixed, respectively, to frames 70, 70a. The latch pins have affixed thereto, respectively, arms 81, 81a the lower ends of which are connected to arms 76, 76a by links 82, 82a. Springs 83, 83a urge the latch pins into engagement with the tapered holes in the quadrants. Links 84, 84a are pivotally connected at their upper ends by pivot pins 85, 85a (see Figures 1, 3 and 8) to frames 70, 70a, respectively, and at their lower ends to lugs 69, 69a by pivot pins 86, 86a, respectively. It will be apparent that when lever 75 is actuated to release latch pins 79, 79a, back rest 14 may swing about the axis of shaft 72, and the seat 13 may swing about the axis of pivot pin 61, the relative angular movements of the seat and back rest being under control of links 84, 84a. In the construction shown, the relationship of the various pivotal axes are such that when the back rest 14 swings through 20°, about the axis of shaft 72, seat 13 swings through 6° about the axis of pivot pin 61. The seat back rest is provided with any suitable padded cushion 87. Arm rest 88a (see Figures 1 and 8) is pivoted on pin 85a and is provided with a notch 89a which engages a pin 90a. The arm rest may be raised to the dotted line position, as shown in Figure 8, to render the seat more accessible. It is also apparent that while an arm rest has been shown on only one side of the chair, a similar arm rest may be employed on the other side thereof. A pair of straps 91, 91a are secured at their lower ends to side frames 60, 60a, respectively, and the upper ends are apertured, as shown, to receive suitable fittings (not shown) on the ends of a safety belt.

In an operative embodiment of the invention the distance between centers of 61 and 86 is 12⅜ inches; between 86 and 85, 12⅝ inches; between 72 and 85, 8⅜ inches; with 61 and 86 lying on a horizontal line 72 is 2½ inches thereabove and 7 inches to the left (Figure 3) of a vertical line through 61. With these specific distances, or distances in the same proportions, the relative angular movements of the seat and back, previously specified, will be attained. Considering the last named dimension of 2½ inches as unity the respective foregoing distances would be in the proportions of approximately 4.94 unity, 5.05 unity, 3.35 unity, and 2.80 unity. It is to be understood, however, that if it be desired to vary the relative angular movements of the seat and back from those specified, the foregoing proportions may be varied as desired.

It will be observed that the upper ends of 36, 37 and 36a, 37a are open, which renders the chair ideally adapted for use with an expulsion device when employed in aircraft. When so employed, any suitable expulsion means, such as a cylinder and piston therein, may be disposed beneath the carrier 12 at a desired position. When the pilot operates the piston, such as by a gun powder discharge in the cylinder, the piston may engage the carrier and bodily blow it, the seat, the back rest, and the pilot upwardly out of the aircraft, after which, of course, he releases the chair components to which he is attached and descends by parachute to the ground.

Having described the invention, what we claim as new is:

1. An adjustable chair, comprising; a seat and back rest carrier, a seat pivotally connected at its rear end to said carrier, a back rest connected to said carrier at its lower end by a pivotal connection, the pivotal connection being disposed between vertical planes that bound the front and rear ends of said seat, linkage means interconnecting said seat and back rest adapted to angularly move one in response to angular movement of the other, and means for selectively securing the seat and back rest to the carrier at a desired position of adjustment relative thereto.

2. A chair in accordance with claim 1 wherein a predetermined angular movement of said back rest imparts about one-third of such angular movement to said seat through said linkage means.

3. A chair in accordance with claim 1 wherein a 20° angular movement of said back rest im-

parts 6° of angular movement to said seat through said linkage means.

4. A chair in accordance with claim 1 wherein said back rest is pivotally connected to said carrier above said seat.

5. A chair in accordance with claim 1 wherein said linkage means comprises a link pivotally connected at its upper end to said back rest, between the ends of the latter, and pivotally connected at its lower end to said seat between the pivotal connection of the back rest to the carrier and the forward end of said seat.

6. A chair in accordance with claim 5 wherein said back rest is pivotally connected to said carrier above said seat.

7. A chair in accordance with claim 1 including a frame adapted to be secured to a support, and means connecting said carrier to said frame and embodying mechanism for vertical adjustment of the carrier.

8. A seat in accordance with claim 7 including resilient means for urging said carrier vertically.

9. A chair in accordance with claim 1 including a frame, means adapted to movably support said frame for horizontal movement relative to a support, and means for connecting said carrier to said frame.

10. A seat in accordance with claim 9 wherein the last mentioned means embodies mechanism supporting said carrier for vertical adjustment relative to said frame.

11. An adjustable chair comprising, a chair support, a frame horizontally movable relative to the support, means for selectively securing said frame to the support at a desired position of horizontal adjustment, a seat and back rest carrier vertically movable relative to said frame, means for selectively securing said carrier to said frame at a desired position of vertical adjustment, a seat pivotally connected at its rear end to said carrier, a back rest connected to said carrier at its lower end by a pivotal connection, the pivotal connection being disposed between vertical planes that bound the front and rear ends of said seat, linkage means interconnecting said seat and back rest adapted to angularly move one in response to angular movement of the other, and means for selectively securing the seat and back rest to the carrier at a desired position of adjustment.

12. A chair in accordance with claim 11 wherein said frame comprises a pair of spaced plates having vertical guide means on each plate, and means on said carrier engageable with said guide means for constraining said carrier to said vertical movement.

13. A chair in accordance with claim 12 wherein said guide means comprises pairs of guide rails on each plate, and the means on the carrier comprises spaced rollers engageable between the rails.

14. A chair in accordance with claim 13 wherein said means for securing said carrier to the frame comprises at least one latch pin engageable selectively in one of spaced apertures in at least one of said guide rails.

15. A chair in accordance with claim 11 wherein said last named means comprises an apertured quadrant member secured to the carrier and a latch pin carried by the back rest engageable in the apertures of the quadrant member.

16. An adjustable chair, comprising; a seat and back rest carrier, a seat pivotally connected at its rear end to said carrier, at a first axis, a back rest pivotally connected to said carrier at its lower end at a second axis at a higher level than the first axis, a link pivotally connected at its upper end to the back rest at a third axis above the second axis, and at its lower end to the seat at a fourth axis, the second and third axes being in vertical planes between those that contain the first and fourth axes, the distance between the second axis and a horizontal line extending between the first and fourth axes being a unit distance, the distance between the first and fourth axes being approximately 4.94 times the unit distance, the distance between the second and third axes being approximately 3.35 times the unit distance, the distance between the third and fourth axes being approximately 5.05 times the unit distance, and the horizontal distance between a pair of vertical planes through the first axis and the second axis being approximately 2.80 times the unit distance, whereby 20 degrees movement of the back rest about the second axis imparts substantially 6 degrees movement of the seat about the first axis.

17. In an adjustable chair, a seat and back rest carrier comprising a pair of spaced plates, a substantially horizontal seat having spaced side members, each being pivotally connected at its rear end about a common axis to one of the plates, a back rest comprising upwardly ranging spaced members, each being pivotally connected at its lower end about a common axis to one of the plates, the last named axis being above the first named axis and between the ends of the seat, and a pair of downwardly and forwardly ranging links, each being pivotally connected about a common axis at its upper end to one of said upwardly ranging members, each link being pivotally connected about a common axis at its lower end to one of said side members, and means for selectively securing the seat and back rest to the carrier at a desired position of adjustment relative thereto.

18. In a chair in accordance with claim 17, including means for supporting said carrier for horizontal bodily movement, and means for vertically adjusting said carrier on the last named means.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,292,414	Vernon	Aug. 11, 1942
2,367,829	Shinn	Jan. 23, 1945
2,383,173	Watter	Aug. 21, 1945
2,485,111	Robbins	Oct. 18, 1949
2,492,105	Orton	Dec. 20, 1949

FOREIGN PATENTS

Number	Country	Date
853,982	France	Dec. 23, 1939