United States Patent

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[54] **ADJUSTABLE CHAIR AND CONTROL THEREFOR**
9 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **297/344,** 297/349, 297/354, 248/429
[51] **Int. Cl.** **A47c 1/02,** A47c 1/06, A47c 3/00
[50] **Field of Search** 297/71, 327, 329, 330, 346, 347, 349, 344, 354, 361, 420; 248/429, 425

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ABSTRACT: A single control for an adjustable chair for aircraft, or the like. Different embodiments of the chair are capable of different combinations of fore-and-aft linear movement, lateral linear movement, selective directional linear movement, swiveling movement, tilting movement, and the like. The chair includes different locking means for locking it against the different movements, respectively. A single, manually operable control means mechanically connected to the different locking means used in a particular embodiment unlocks all of them so that the chair can be maneuvered into any desired position by the body of a person seated therein. Upon releasing the single control means, all of the locking means automatically relock.

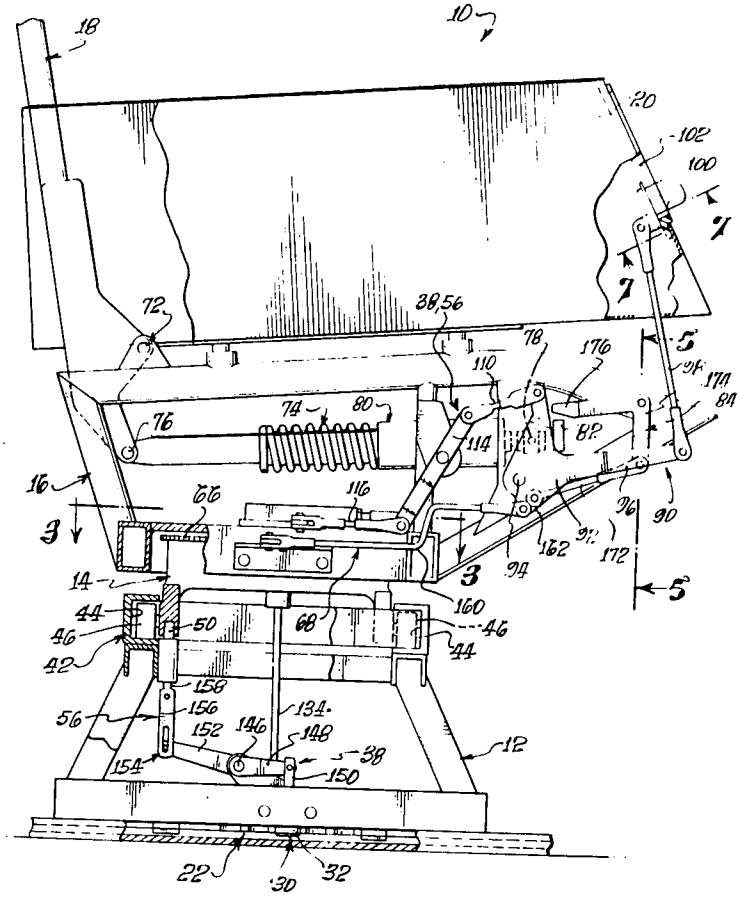
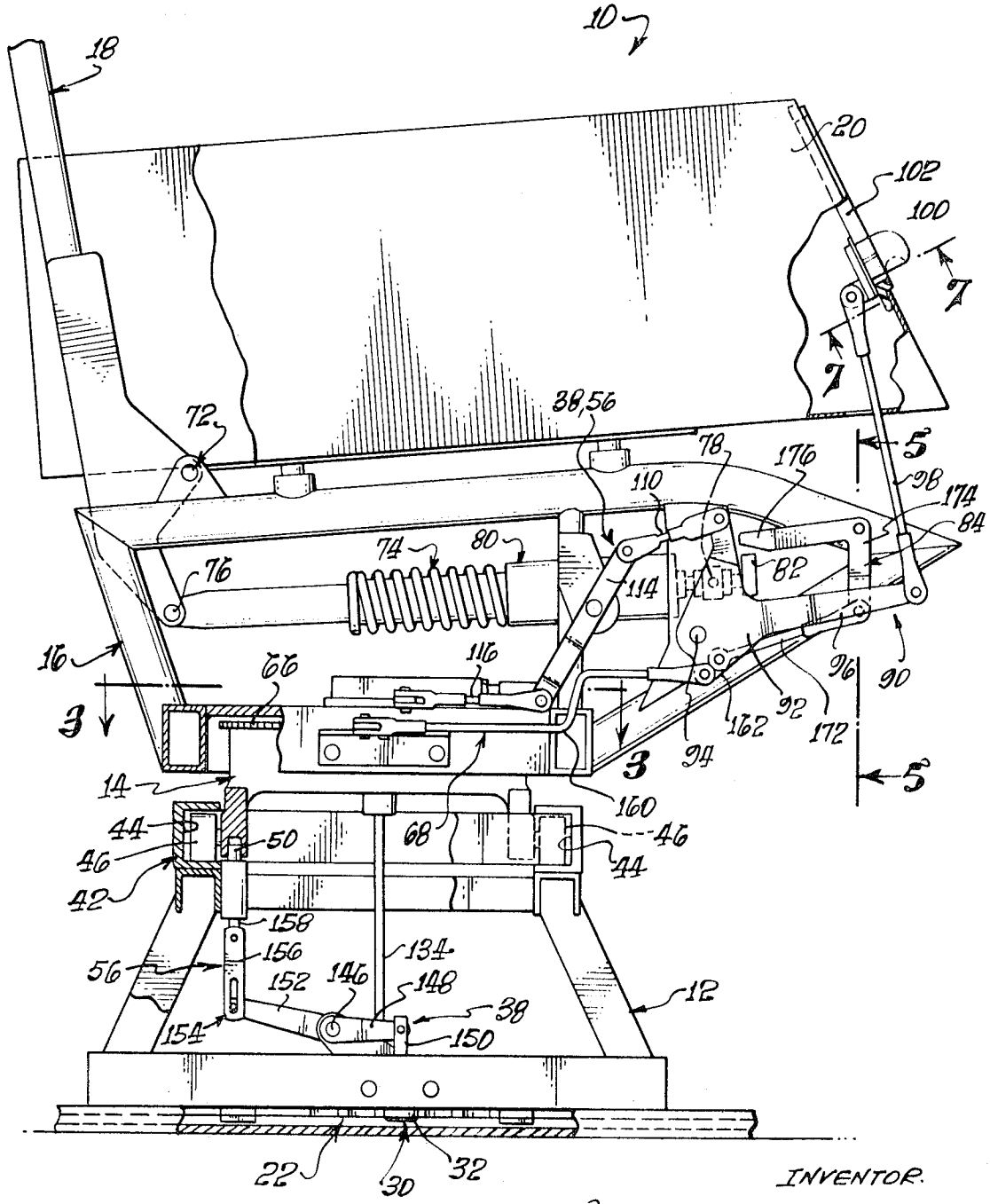


FIG. 1.



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FIG. 2.

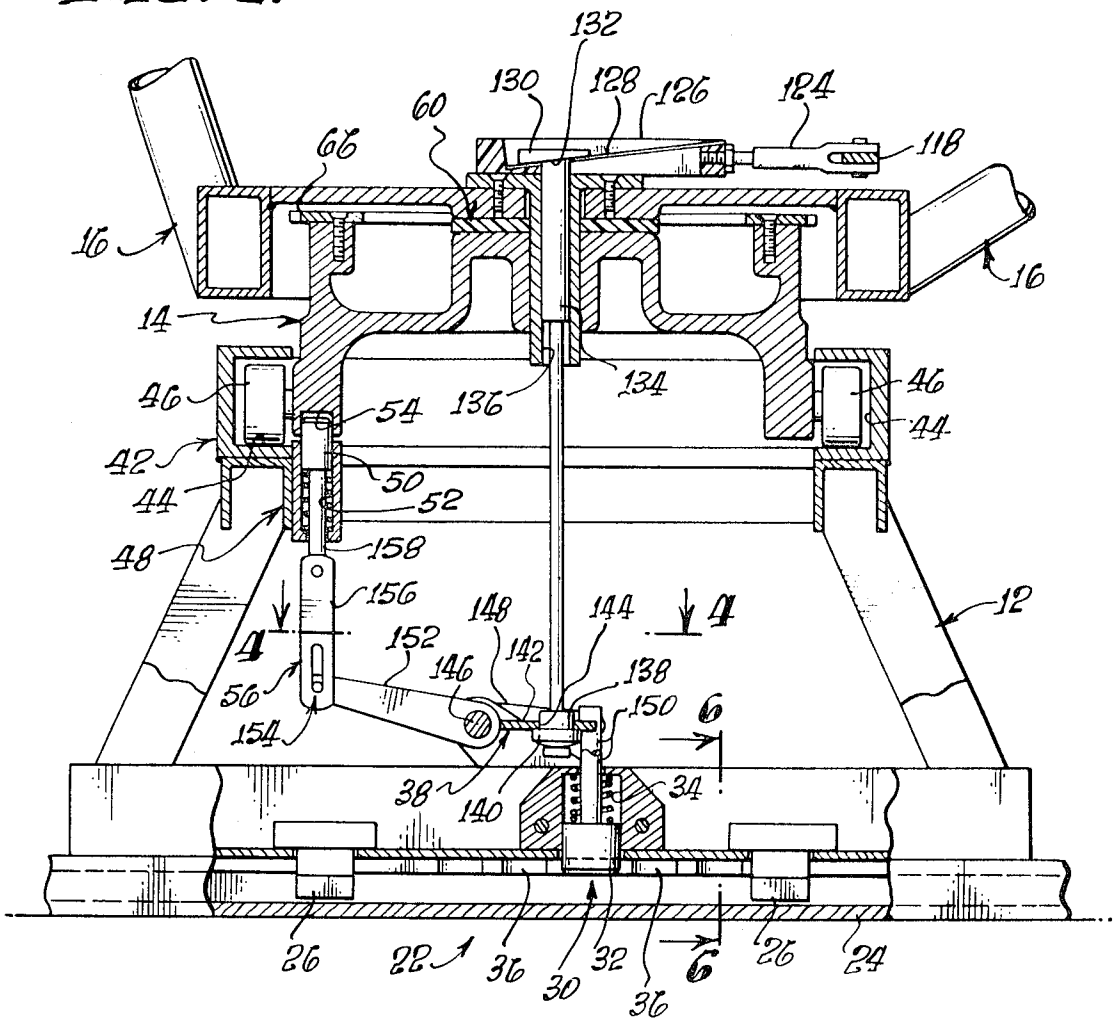


FIG. 7.

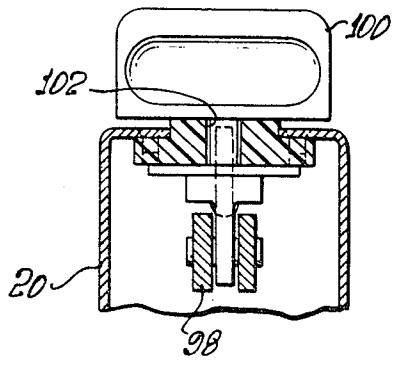
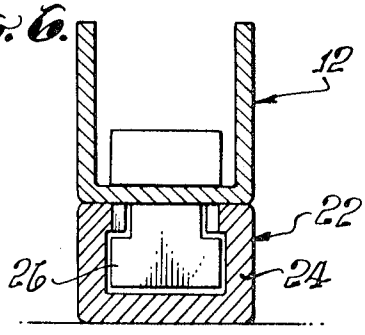


FIG. 6.



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FIG. 3.

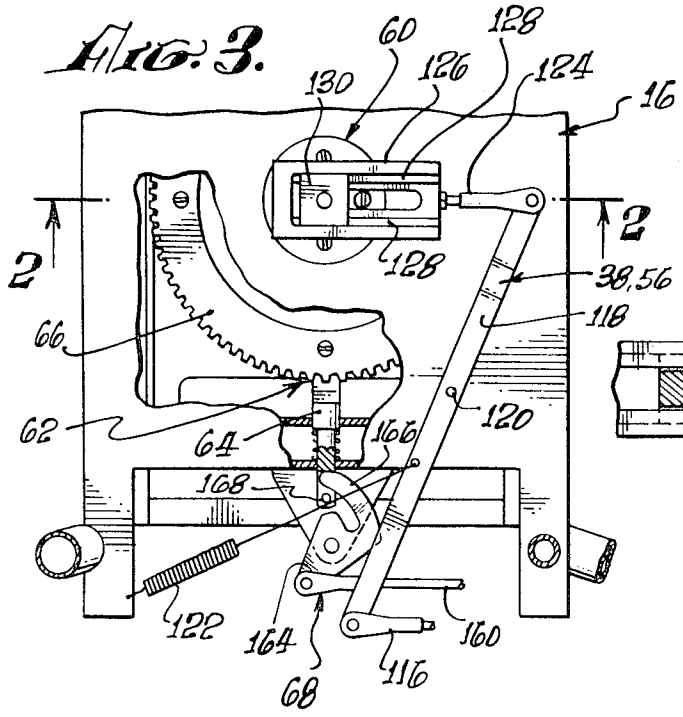


FIG. 4.

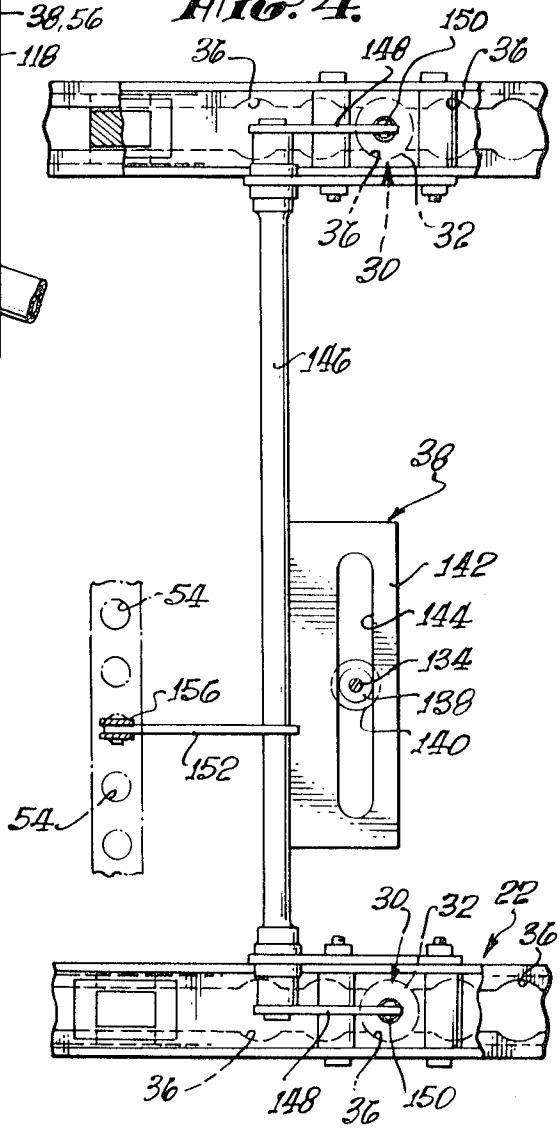
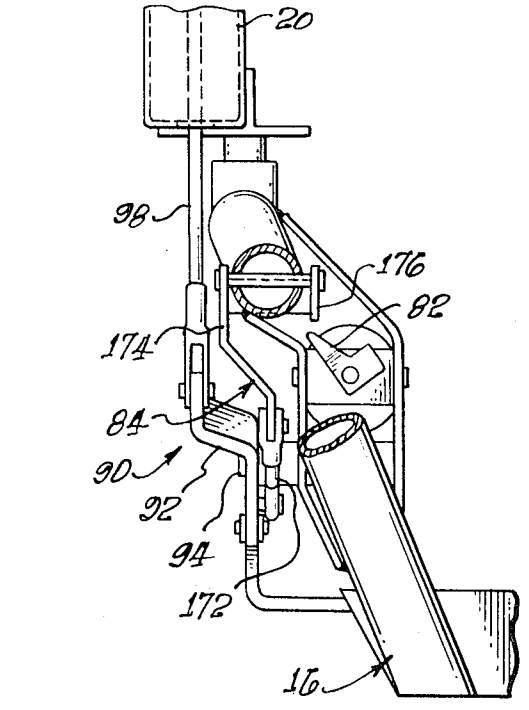


FIG. 5.



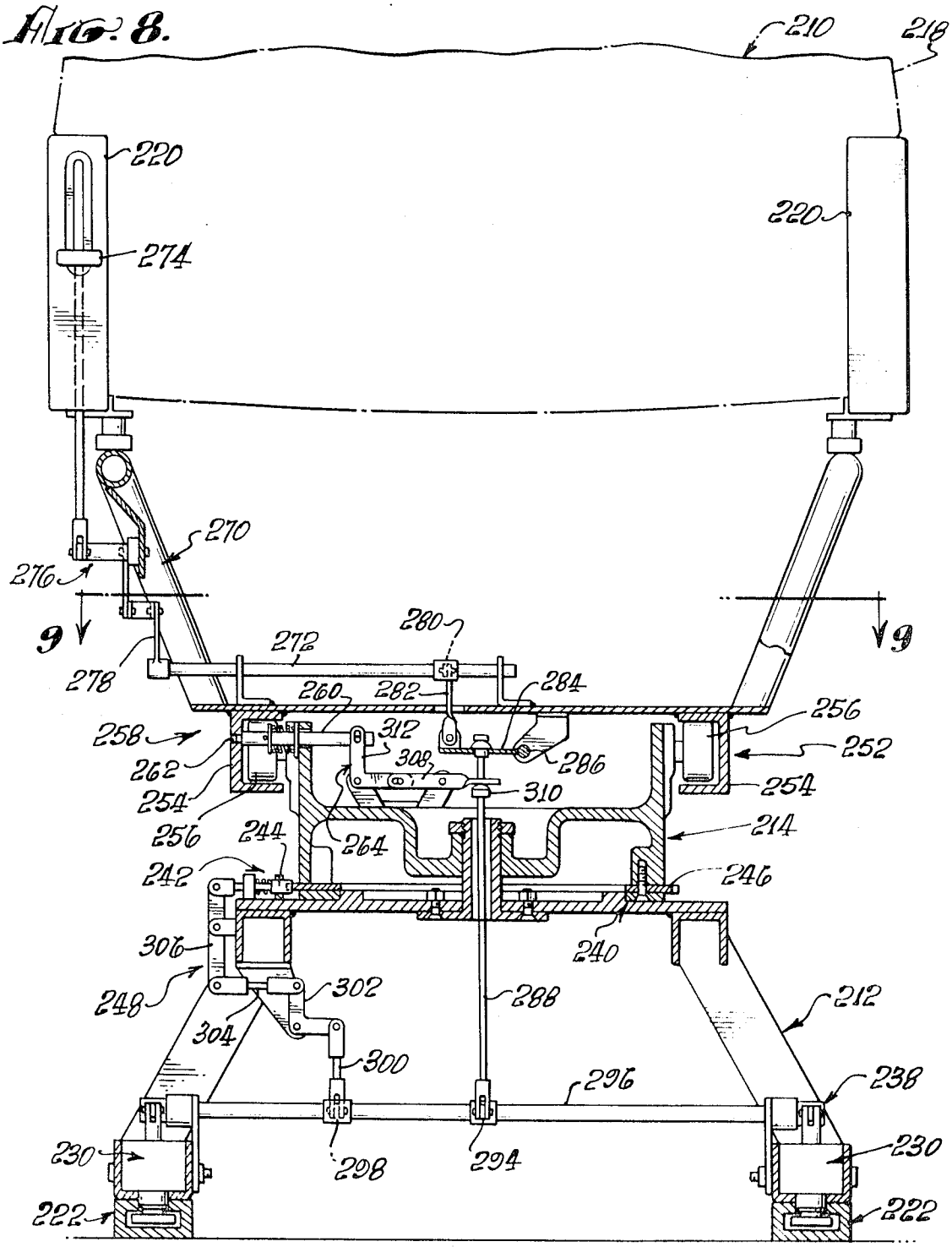
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FIG. 8.



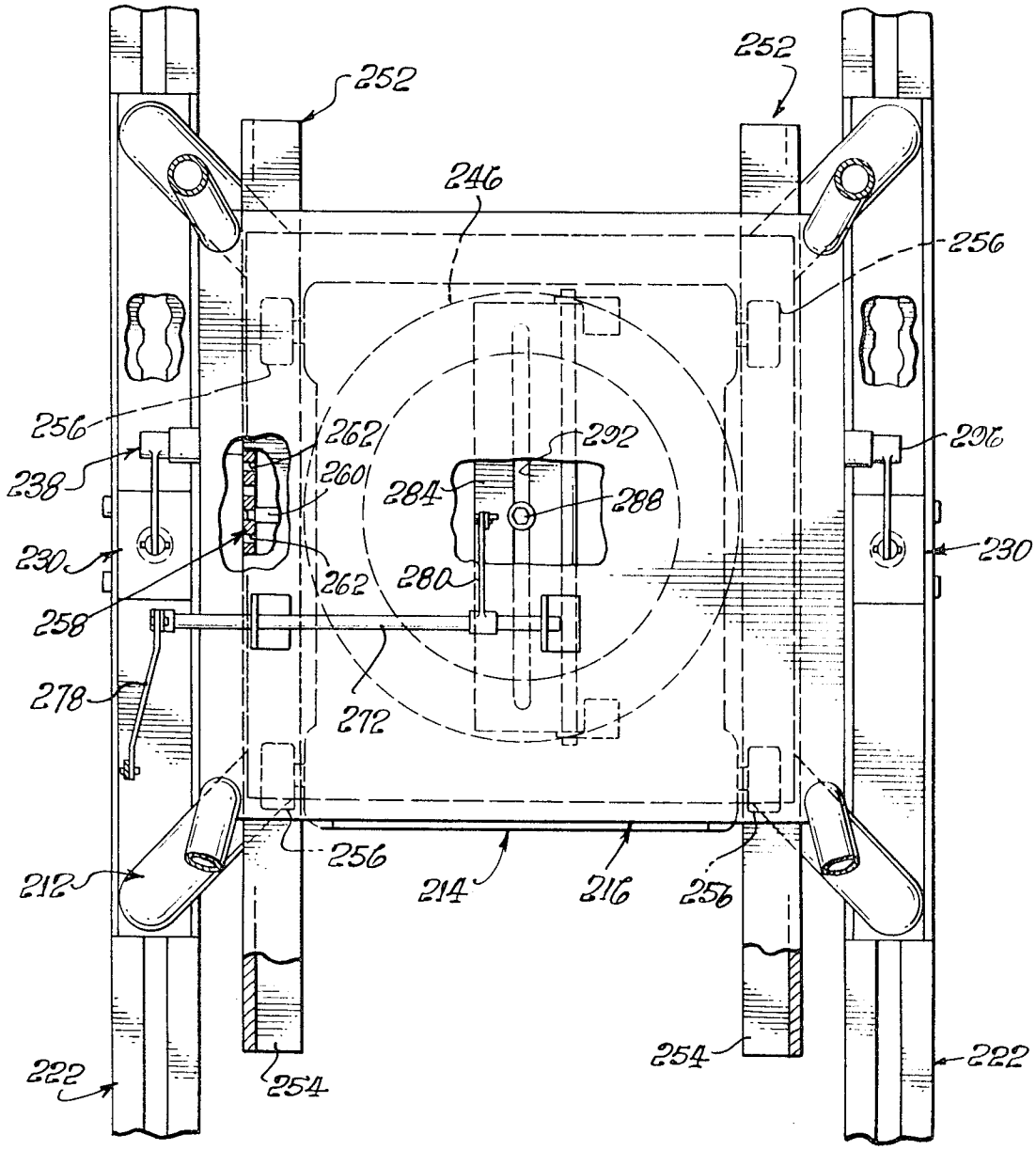
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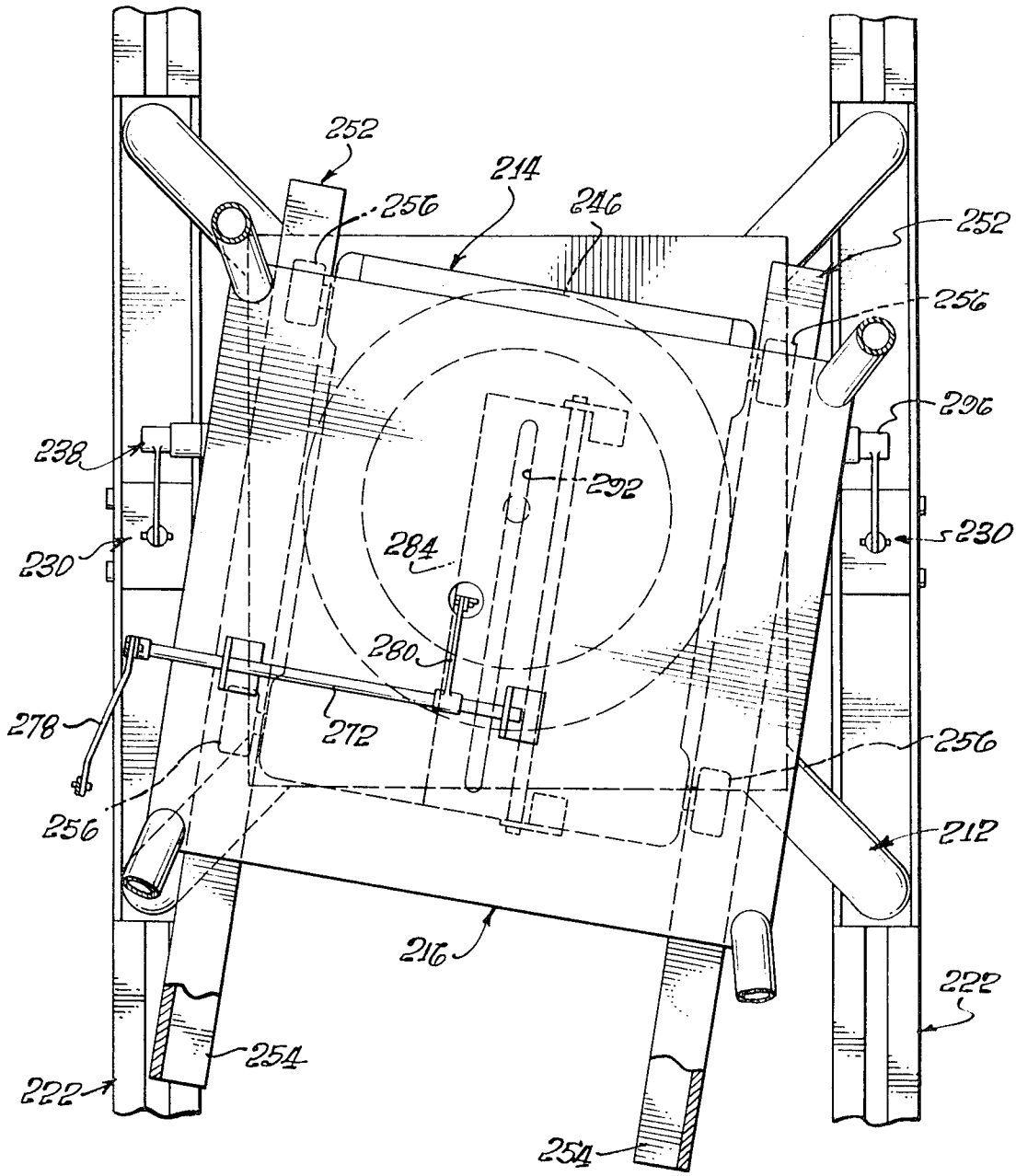
FIG. 9.



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FIG. 10.



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ADJUSTABLE CHAIR AND CONTROL THEREFOR

BACKGROUND OF INVENTION

Many airplanes, particularly corporate aircraft, have club or lounge sections equipped with chairs capable of various combinations of fore-and-aft movement, lateral movement, swiveling movement and tilting movement, i.e., the chair back is capable of tilting rearwardly into a reclining position. During takeoff and landing, the chair is normally locked in a forwardly facing position adjacent the side of the fuselage and with the back in a relatively upright position. However, in the air, or on the ground, the chair may be moved forwardly or rearwardly, may be moved laterally away from the side of the fuselage, may be turned at any desired angle to the longitudinal axis of the aircraft, and/or may be tilted into any desired reclining position, dependent on the desires of the occupant. Conventionally, such a chair is equipped with independent locking means for locking it against the different movements, respectively, in any desired position.

Prior to the present invention, adjustable chairs of the foregoing nature have been equipped with separate control members, such as knobs, levers, or the like, respectively controlling the various locking means. Frequently, particularly in business aircraft, such chairs are power-operated, with electric motors for producing the respective movements. In this case, the independent control members are switches.

Individual controls of the foregoing nature for the respective chair movements require the passenger to go through a series of control member manipulations to achieve the desired chair position. Frequently, the desired final position for the chair cannot be achieved without considerable trial and error and without considerable reversing of some of the movements. Also, if the chair is power-operated, electrical connections must be available at the location of the chair, and, if a substantial number of such chairs is installed on an aircraft, its generating capacity may have to be increased.

SUMMARY AND OBJECTS OF INVENTION

With the foregoing background in mind, one primary object of the invention is to provide, in combination with a chair having plural locking means for automatically locking it against various combinations of movements, such as fore and aft, lateral, swiveling, tilting and selective directional movements, a single manually operable control means for unlocking all of the locking means. With this construction, a passenger seated in the chair does not need to fumble with several individual controls in sequence, or in various combinations, but merely actuates a single control so that the chair may readily be maneuvered into the desired position by appropriate manipulations of the body of the passenger seated therein. As will be apparent, a person seated in a chair of this nature can very readily shift it directionally (e.g., fore and aft and/or laterally and/or in other directions), and/or turn it, and/or change the inclination of its back, simply by directing his body correspondingly. This can be accomplished instinctively with no mental or trial-and-error effort required to ascertain which one or a combination of a plurality of individual control members must be operated to achieve the desired effect.

Another primary object of the invention is to provide a chair wherein the single, manually operable control means is simply connected to the various locking means mechanically. This avoids any necessity for making electrical, hydraulic, or other, power available at the chair location, which is a feature of the invention.

More particularly, the invention in one of its embodiments may be summarized as comprising, and an object of the invention is to provide a chair comprising: a substructure; fore-and-aft track means providing for fore-and-aft movement of the substructure; substructure locking means for automatically locking the substructure against fore-and-aft movement; a base carried by the substructure; lateral track means interconnecting the base and the substructure and providing for lateral movement of the base relative to the substructure; base-locking means for automatically locking the base against lateral movement relative to the substructure; a seat carried by the base; swivel means interconnecting the seat and the base and providing for swiveling movement of the seat relative to the base about an upright axis; seat locking means for automatically locking the seat against swiveling movement relative to the base; a back pivotally connected to the seat for tilting movement relative thereto; back locking means for automatically locking the back against tilting movement relative to the seat; and a single, manually operable control means mechanically connected to all of the locking means by corresponding linkages for unlocking all of them so that an occupant can maneuver the chair into the desired position, whereupon the control means is released so that the locking means automatically relock to hold the chair in the selected position.

An important object of the invention is to provide a chair having a seat capable of selective directional movement, i.e., capable of being turned to face in a desired direction, and then capable of being moved linearly back and forth in that direction. This construction permits a person seated in the chair to turn the seat toward a desired area, and then move the seat toward and away from that area as desired, as in manipulating controls in an airplane cockpit, or the like, which is a very important feature.

Another object of the invention in connection with the embodiment referred to in the preceding paragraph is to provide a chair comprising: a substructure; linear track means providing for linear movement of the substructure, such as linear lateral movement or linear fore-and-aft movement; a base carried by the substructure; swivel means interconnecting the base and the substructure and providing for swiveling movement of the base relative to the substructure about an upright axis to permit selection of a desired direction of orientation for a seat carried by the base; linear track means interconnecting the seat and the base and providing for linear movement of the seat relative to the base in the selected direction mentioned; substructure locking means for automatically locking the substructure against linear movement; base-locking means for automatically locking the base against swiveling movement relative to the substructure; seat-locking means for automatically locking the seat against linear directional movement relative to the base; and a single, manually operable control means mechanically connected to all of the locking means by corresponding linkages for unlocking all of them so that an occupant can maneuver the chair into the desired position, the locking means all automatically relocking upon release of the control means so as to hold the chair in the selected position.

Another and more specific object of the invention is to provide a construction wherein the various linkages of each embodiment all include in common a master lever pivotable by a single, manually operable control member movably mounted on the chair in any convenient location.

Still another specific object is to provide a construction wherein two of the linkages of each embodiment include, in common, a rod reciprocable along the axis of the swivel means and having its lower end connected to certain of the locking means, and rod-shifting means connected to the upper end of the rod and operable by the single control means for axially shifting the rod to unlock such locking means.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in the adjustable chair art in the light of this disclosure, may be achieved with the exemplary embodiment of the invention described in detail hereinafter and illustrated in the accompanying drawings.

DESCRIPTION OF DRAWINGS

In the drawings:

FIG. 1 is a fragmentary view, primarily in side elevation, but partially in vertical section, of an adjustable chair which embodies the invention;

FIG. 2 is an enlarged, fragmentary vertical sectional view of the lower portions of the chair, FIG. 2 being taken as indicated by the arrowed line 2—2 of FIG. 3;

FIG. 3 is a fragmentary horizontal sectional view taken as indicated by the arrowed line 3—3 of FIG. 1;

FIG. 4 is a fragmentary horizontal sectional view taken as indicated by the arrowed line 4—4 of FIG. 2;

FIG. 5 is an enlarged, fragmentary vertical sectional view taken as indicated by the arrowed line 5—5 of FIG. 1;

FIG. 6 is an enlarged, fragmentary sectional view taken as indicated by the arrowed line 6—6 of FIG. 2;

FIG. 7 is an enlarged, fragmentary sectional view taken as indicated by the arrowed line 7&—7 of FIG. 1 of the drawings;

FIG. 8 is a vertical sectional view of another adjustable chair which embodies the invention;

FIG. 9 is a horizontal sectional view taken as indicated by the arrowed line 9—9 of FIG. 8; and

FIG. 10 is a view similar to FIG. 9, but showing the seat of the chair oriented in a selected direction for linear back and forth movement in that direction.

The various figures of the drawings show only the mechanical structures of the illustrative embodiments of the chair of the invention, all upholstering, and the like, being omitted for clarity.

DESCRIPTION OF EXEMPLARY EMBODIMENT OF INVENTION, FIGS. 1 TO 7

Referring initially to FIG. 1 of the drawings, the adjustable chair of the invention illustrated therein is designated generally by the numeral **10** and includes as its major components a substructure **12**, a base **14** surmounting and carried by the substructure, a seat or seat frame **16** surmounting and carried by the base **14**, and a back or back frame **18** carried by the seat. In the particular construction illustrated, the seat **16** also carries laterally spaced arms or arm frames **20**. However, such arms are not necessary.

The substructure **12** is moveable in a fore-and-aft direction on a fore-and-aft track means **22** which, as best shown in FIGS. **2**, **4** and **6**, may comprise laterally spaced, fore-and-aft stationary tracks **24** receiving track followers **26** on the substructure **12**.

The chair **10** includes substructure locking means **30** for automatically locking the substructure **12** against fore-and-aft movement along the track means **22**. As best shown in FIGS. **2** and **4**, the substructure locking means **30** includes two laterally spaced locking plungers **32** vertically reciprocable in bores **34** in the substructure **12**, and each downwardly insertable into one of a plurality of locking recesses **36** formed in the corresponding track **24** and spaced apart in the fore-and-aft direction. The locking plungers **32** may be biased downwardly, as shown in FIG. **2**. The locking plungers **32** are retracted upwardly, to unlock the substructure locking means **30**, by an unlocking linkage **38** which will be described in more detail hereinafter.

A lateral track means **42** interconnecting the base **14** and the substructure **12** provides for lateral movement of the base relative to the substructure. As shown in FIGS. **1** and **2**, the lateral track means may comprise lateral tracks **44** carried by the substructure **12** and spaced apart in the fore-and-aft direction, and track followers **46** carried by the base **14**.

A base-locking means **48** automatically locks the base **14** against lateral movement relative to the substructure **12**. As shown in FIGS. **1**, **2** and **4**, the base-locking means **48** may comprise a locking plunger **50** vertically reciprocable in a bore **52** in the substructure **12** and upwardly insertable into one of a series of laterally spaced locking recesses **54** in the base **14**. As shown in FIG. **2**, the locking plunger **50** may be spring-biased upwardly into its extended or locked position. A base-unlocking linkage **56** to be described in more detail hereinafter is connected to the locking plunger **50** and is adapted to retract same downwardly to unlock the base locking means **48**.

As best shown in FIG. **2**, the seat **16** is connected to the base **14** by a swivel means **60**, of any suitable construction, which permits swiveling or pivotal movement of the seat relative to the base about an upright, e.g., vertical, axis. A seat-locking means **62** automatically locks the seat **16** against swiveling movement relative to the base **14**. The seat-locking means **62**, which is best shown in FIG. **3**, includes a toothed locking plunger **64** carried by the seat **64** and movable radially inwardly and outwardly relative thereto with reference to the axis of the swivel means **60**. The locking plunger **64** is spring-biased radially inwardly into engagement with the periphery of a gear **66** concentric with the swivel means **60** and carried by the base **14**.

A seat-unlocking linkage **68** is connected to the locking plunger **64** and is adapted, when actuated, to retract the locking plunger radially outwardly to unlock the seat-locking means **62**. This releases the seat **16** so that it can be turned into any desired angular position about the axis of the swivel means **60**.

The chair back **18** is pivotally connected to the seat **16** by a transversely extending pivot means **72** located adjacent the bottom of the chair back and the rear of the seat, as best shown in FIG. **1**. As is conventional, the chair back **18** may be tilted through an angular range of positions.

Tilting of the chair back **18** is controlled by a unit **74** which is pivotally connected to the chair back at **76** and to the seat **16** at **78**. The tilt control unit **74** is a conventional, commercially available unit which includes and constitutes a means **80** for automatically locking the chair back **18** against tilting movement relative to the seat **16** in any desired position. The tilt control unit **74** also includes, at its forward end, a pivotable unlocking member **82**, such unlocking member being pivotable in the counterclockwise direction, as viewed in FIG. **5**, to unlock the back-locking means **80** constituted by the tilt control unit **74**. A back-unlocking linkage **84**, to be described in detail hereinafter, is operable on the unlocking member **82** to pivot same as required to unlock the back-locking means **80**. The tilt control unit **74** is disclosed in more detail in U.S. Pat. Nos. 2,559,047, 2,922,497 and 3,051,274.

The substructure-unlocking linkage **38**, the base-unlocking linkage **56**, the seat-unlocking linkage **68**, and the back-unlocking linkage **84** are all actuable by a single, manually operable control means **90**. As best shown in FIG. **1**, the control means **90** includes a master control lever **92** which is common to all of the unlocking linkages **38**, **56**, **68** and **84**, and which is pivotally connected to the seat **16** adjacent the front thereof, at **94**. The master control lever **92** includes a forwardly extending handle **96** for direct manual operation thereof.

Alternatively, in the particular construction illustrated, the handle **96** has pivotally connected thereto an upwardly extending link **98** the upper end of which is pivotally connected to a slidable control member **100** carried by the front edge of one of the arms **20**. As shown in FIG. **7**, the control member **100** may slide upwardly in a slot **102** to pivot the master control lever **92** in the counterclockwise direction, as viewed in FIG. **1**.

In either event, the control means **90** comprises a single manually operable control member for actuating all of the unlocking linkages **38**, **56**, **68** and **84**, whether this control member be regarded as the member **96**, or the member **100**.

Turning now to a more detailed consideration of the various unlocking linkages hereinbefore referred to generally, the substructure and base-unlocking linkages **38** and **56** have several components in common. First, these linkages include a link **110** pivotally connected at one end to an arm **112** of the master control lever **92**, and at its other end to one end of a lever **114**. The latter is pivotally mounted intermediate its ends on the seat **16**, and has its other end pivotally connected to one end of a link **116**. Turning to FIG. **3**, the link **116** is pivotally connected at its other end to one end of a lever **118** which is pivotally mounted intermediate its ends, at **120**, on the seat **16**, and which is biased in the clockwise direction, as

viewed in FIG. 3, by a tension spring 122. The opposite end of the lever 118 has pivotally connected thereto a link 124, FIGS. 2 and 3, terminating in a slide 126 having inclined-plane cam surfaces 128. Seated on the slide 126 is a wedgelike cam 130 having an inclined-plane cam surface 132 complementary to and seated on the cam surface 132 complementary to and seated on the cam surfaces 128. The cam 130 is connected to the upper end of a rod 134 the axis of which coincides with the axis of the swivel means 60, and which is reciprocable along such axis. The rod 134 is guided by a bore 136 in the seat 16 in the particular construction illustrated.

The foregoing elements, beginning with the link 110 and ending with the rod 134, are all common to the substructure and base-unlocking linkages 38 and 56. As will be apparent, counterclockwise pivoting of the master control lever 92, as viewed in FIG. 1, results in counterclockwise pivoting of the lever 114, as viewed in FIG. 1, counterclockwise pivoting of the lever 118, as viewed in FIG. 3, rearward movement of the wedgelike cam slide 126, and upward movement of the rod 134. As will now be explained, such upward movement of the rod 134 unlocks the substructure-locking means 30 and the base-locking means 48.

As shown in FIGS. 2 and 4, the lower end of the rod 134 is provided thereon with a head 138 having an annular flange 140 seated under a plate 142. The latter is provided therein with a slot 144 for the head 138 which extends transversely of the chair 10 to permit lateral movement of the base 14. The plate 142 is welded, or otherwise secured, to a transversely extending rod 146 pivotally mounted on the substructure 12. The rod 146 is provided at its ends with arms 148 the free ends of which are pivotally connected to the upper ends of upwardly projecting stems 150 on the substructure-locking plungers 32. Thus, when the master control lever 92 is pivoted in the counterclockwise direction, as viewed in FIG. 1, the rod 134 is shifted upwardly to retract the substructure locking plungers 32 upwardly, thereby freeing the substructure 12 for fore-and-aft movement.

Completing the consideration of the base-unlocking linkage 56, the transverse pivoted rod 146 also carries an arm 152, FIGS. 1, 2 and 4, having a pivotal, lost motion connection 154 to a link 156 which, in turn, is pivotally connected to a depending stem 158 on the base-locking plunger 50. (The lost motion pivotal connection 154 is necessary to enable the pivoted rod 146 to retract both the substructure-locking plungers 32 and the base-locking plunger 50). As will be apparent, when the rod 134 is axially shifted upwardly in response to counterclockwise movement of the master control lever 92, the rod 134, acting through the plate 142, the rod 146, the arm 152, the link 156 and the stem 158 retracts the base-locking plunger 50 downwardly so that the base 14 may be shifted laterally as desired at the same time that the substructure 12 is being shifted in the longitudinal or fore-and-aft direction.

Considering now the unlocking linkage 68, it includes, as best shown in FIGS. 1 and 3, a link 160 pivotally connected at one end to an arm 162 of the master control lever 92. The link 160 is pivotally connected at its other end to a lever 164, FIG. 3, pivotally mounted intermediate its ends on the seat 16 and provided at its other end with a hooklike cam 166 engageable with a pin 168 on the seat locking plunger 64.

Thus, when the master control lever 92 is pivoted in the counterclockwise direction, as viewed in FIG. 1, to unlock the substructure and base-locking means 30 and 48, it also, through the link 160, pivots the lever 164 in the counterclockwise direction, as viewed in FIG. 3, to retract the toothed locking plunger 64 radially out of engagement with the gear 66 to release the seat 16 so that it may be turned into any desired angular position about the axis of the swivel means 60.

Turning finally to a consideration of the chair back-unlocking linkage 84, it includes a link 172, FIG. 1, pivotally connected at one end to the arm 162 of the master control lever 92. The link 172 is pivotally connected at its other end to one arm of a crank 174. The other arm of the crank 174 terminates in a lateral offset 176 which is engageable with the unlocking member 82 of the tilt control unit 74, to pivot this unlocking member in a direction to unlock the tilt control unit, as hereinbefore explained. This occurs concurrently with the hereinbefore explained unlocking of the substructure-locking means 30, the base-locking means 48 and the seat-locking means 62.

Thus, as will be apparent, the present invention provides a single, manually operable control means 90, which may be regarded as including either the master control lever 92 or the control member 100 as its dominant member, for unlocking all four of the locking means 30, 48, 62 and 80, through the various mechanical linkages 38, 56, 68 and 84 hereinbefore described.

DESCRIPTION OF EXEMPLARY EMBODIMENT OF INVENTION, FIGS. 8 TO 10

These figures of the drawings illustrate an adjustable chair 210 of the invention which, in some respects, is similar or identical to the adjustable chair 10 described previously. Consequently, only the differences will be described specifically.

In general, the adjustable chair 210 includes as its major components a substructure 212, a base 214 surmounting and carried by the substructure, a seat or seat frame 216 surmounting and carried by the base, and a back or back frame 218 carried by the seat. Again, the seat 216 is shown as carrying laterally spaced arms or arm frames 220, but these are not necessary.

The substructure 212 is mounted for linear movement. In the particular embodiment under consideration, the substructure 212 is movable in a fore-and-aft direction on a fore-and-aft track means 222. The latter is similar to the track means 22 so that a further description is not necessary.

The adjustable chair 210 also includes substructure-locking means 230 which is similar to the substructure-locking means 30 and which will not be described in detail. A substructure-unlocking linkage 238 unlocks the substructure-locking means 230 in a manner substantially identical to that in which the substructure-unlocking linkage 38 unlocks the substructure-locking means 30.

The base 214 is connected to the substructure 212 by a swivel means 240, of any suitable construction, which permits swiveling or pivotal movement of the base relative to the substructure about an upright, e.g., vertical, axis. A base-locking means 242 automatically locks the base 214 against swiveling movement relative to the substructure 212. The base-locking means 242, as best shown in FIG. 8, is similar to the seat-locking means 62 and comprises simply a toothed-locking plunger 244 carried by the substructure 212 and movable radially inwardly and outwardly relative thereto with reference to the axis of the swivel means 240. The locking plunger 244 is spring-biased radially inwardly into engagement with the periphery of a gear 246 concentric with the swivel means 240 and carried by the base 214. With this construction, the base 214 may be locked in any desired angular position about the axis of the swivel means 240.

A base-unlocking linkage 248 is connected to the locking plunger 244 and is adapted, when actuated, to retract the locking plunger radially outwardly to unlock the base locking means 242. This releases the base 214 so that it can be turned into any desired angular position about the axis of the swivel means 240.

A linear track means 252 interconnects the seat 216 and the base 214 and provides for selective directional movement of the seat relative to the base. More particularly, after the base 214 has been pivoted into an angular position corresponding to the desired angular orientation of the seat 216, the seat may be moved back and forth, along the track means 252, in a corresponding direction, as shown in FIG. 10. In the particular construction illustrated, the direction in which the seat 216 is movable back and forth along the track means 252 is the same as the direction in which the seat faces. In other words, the

track means 252, in conjunction with the swivel means 240, permits selective directional fore-and-aft movement of the seat 216. Thus the occupant of the chair 210 can face a desired area, and can then move himself back and forth toward and away from that area as desired. This is particularly valuable in a chair 210 for use by a pilot, copilot, flight engineer, navigator, or the like. For example, a flight engineer can pivot his seat 216 to face a desired area, and can then move his seat toward that area to reach engine controls, or the like, therein more easily, which is a very important feature of the invention.

The track means 252 may comprise simply tracks 254 carried by the seat 216 and spaced apart laterally thereof, such tracks extending in a fore-and-aft direction with respect to the seat. Disposed in the tracks 254, which are channel shaped, are track-following rollers 256 carried by the base 214.

A seat-locking means 258 automatically locks the seat 216 against selective directional movement along the track means 252. As best shown in FIG. 8, the seat-locking means comprises simply a spring-biased locking plunger 260 carried by the base 214 and insertable into any one of a series of holes 262 in one of the tracks 254. A seat-unlocking-linkage 264 to be described in more detail hereinafter is connected to the locking plunger 260 and is adapted to retract same to unlock the seat 216 for linear movement along the track means 252 in the direction selected by pivoting the base 214 about the upright axis of the swivel means 240.

Although the seat 216 has been described as capable of selective directional movement generally in the fore-and-aft direction, it may be capable of selective directional movement generally in a lateral direction, or in any other desired general direction.

In the adjustable chair 210 illustrated, the back 218 is not shown as tiltable into and out of a reclining position, the reason being that this particular chair is especially intended for use by a flight crew. However, if desired, the back 218 may be tiltable, and may be provided with a back-locking means and a back unlocking linkage, neither of which is shown, respectively similar to the back-locking means 80 and the back unlocking linkage 84.

The substructure-unlocking linkage 238, the base-unlocking linkage 248, and the seat-unlocking linkage 264 are all actuable by a single, manually operable control means 270. The latter includes a pivotable master control shaft 272 carried by the seat 216. This master control shaft is adapted to be pivoted into a position to actuate the various unlocking linkages 238, 248 and 264, by a control handle 274 mounted on the seat 216 in any convenient location. In the particular construction illustrated, the control handle 274 is shown as mounted on one of the arms 220 and is connected to the master control shaft 272 by a suitable linkage 276 which includes a crank 278 for rocking the shaft 272.

The master control shaft 272 is offset from the upright axis of the swivel means 240 and carries an arm 280, FIGS. 9 and 10, which is connected by a link 282 to a lever 284 pivotally mounted on the seat 216 at 286, as best shown in FIG. 8. When the master control shaft 272 is rocked in a direction to cause the arm 280 to pivot the lever 284 upwardly, this lever displaces a master control rod 288 upwardly along the upright axis of the swivel means 240, the rod being coaxial with the swivel means. The lever 284 accomplishes this by engaging a button 290 on the rod 288. The lever 284 is in the form of a rectangular plate having therein a longitudinal slot 292, FIGS. 9 and 10, which permits movement of the seat 216 relative to the rod 288 along the track means 252. Such upward movement of the rod 288 in response to corresponding rocking of the master control shaft 272 by the handle 274 actuates all of the unlocking linkages 238, 248 and 264 to cause them to unlock the corresponding locking means 230, 242, and 258.

The lower end of the rod 288 is connected to a crank arm 294 on a pivotable shaft 296 carried by the substructure 212 and forming part of the substructure-unlocking linkage 238. The latter is substantially identical to the substructure-unlocking linkage 38 and unlocks the substructure-locking means 230 in substantially the same way, so that a further description is not necessary.

The base-unlocking linkage 248 is also actuated by the rock shaft 296 and includes an arm 298 on such shaft, a link 300 connecting this arm to a crank 302 on the substructure 212, and a link 304 connecting the crank 302 to a lever 306, the latter being connected to the base-locking plunger 244. With this construction, upon axially upward displacement of the rod 288 in response to rocking of the master control shaft 272, the base-unlocking linkage 248 retracts the plunger 244 to unlock the base 242 for swiveling movement about the upright axis of the swivel means 240. After the base 214 has been swiveled into an angular position such that the seat 216 faces in the desired direction, the base-locking means 242 automatically relocks the base upon releasing of the control means 270.

The seat-unlocking linkage 264 includes a lever 308, FIG. 8, engageable by a button 310 on the rod 288. Upon upward movement of this rod, the button 310 pivots the lever 308 to cause the latter to pivot a crank 312 also mounted on the base 214. The crank 312 retracts the seat-locking plunger 260 to release the seat 216 for movement back and forth along the track means 252 in the direction selected by the occupant, which is an important feature of the invention.

After the chair 210 has been maneuvered into the position desired by the occupant upon unlocking of the various locking means 230, 242 and 258, releasing of the control means 270 results in automatic relocking of the substructure 212, the base 214 and the seat 216 in the desired new positions.

Although exemplary embodiments of the invention have been disclosed for purposes of illustration, it will be understood that various changes, modifications, and substitutions may be incorporated in such embodiments and that the invention may be embodied in other forms.

I claim

1. fore-and-aft capable of fore and aft movement, lateral movement, fore-and-aft tilting movement, the combination of:
   a. a substructure;
   b. fore-and-aft track means carrying said substructure and providing for fore-and-aft movement of said substructure;
   c. substructure locking means for automatically locking said substructure against fore-and-aft movement;
   d. a base carried by said substructure;
   e. lateral track means interconnecting said base and said substructure and providing for lateral movement of said base relative to said substructure;
   f. base-locking means for automatically locking said base against lateral movement relative to said substructure;
   g. a seat carried by said base;
   h. swivel means interconnecting said seat and said base and providing for swiveling movement of said seat relative to said base about an upright axis;
   i. seat-locking means for automatically locking said seat against swiveling movement relative to said base;
   j. a back pivotally connected to said seat for tilting movement relative thereto;
   k. back-locking means for automatically locking said back against tilting movement relative to said seat;
   l. each of said locking means comprising interengageable fixed and movable locking elements;
   m. a single, manually operable control means;
   n. four connecting means respectively directly connecting said movable locking elements to said single control means; and
   o. whereby said single control means unlocks all of said locking means.

2. A chair as defined in claim 1 wherein said connecting means respectively include mechanical linkages respectively connected to said movable locking elements and all connected to said single control means.

3. A chair according to claim 2 wherein said linkages all include in common a master lever pivotally mounted on said seat and forming part of said single control means.

4. A chair as set forth in claim 2 wherein those two of said linkages which are connected to said movable locking elements of said substructure and base locking means include in common:

a. a rod reciprocable along said upright axis of said swivel means and having its lower end connected to said movable locking elements of said substructure and base-locking means; and

b. rod shifting means connected to the upper end of said rod and operable by said single control means for axially shifting said rod to disengage said movable locking elements of said substructure and base locking means from said fixed locking elements thereof.

5. A chair according to claim 4 wherein said rod-shifting means includes relatively slidable, wedgelike cams respectively connected to said rod and said control means.

6. A chair comprising:

a. a substructure;

b. track means carrying said substructure and providing for linear movement of said substructure;

c. a base carried by said substructure;

d. swivel means interconnecting said base and said substructure and providing for swiveling movement of said base relative to said substructure about an upright axis;

e. a seat carried by said base;

f. track means interconnection said seat and said base and providing for linear movement of said seat relative to said base in a selected direction dependent on the angular orientation of said base relative to said substructure about said upright axis;

g. substructure locking means for automatically locking said substructure against linear movement;

h. base-locking means for automatically locking said base against swiveling movement relative to said substructure;

i. seat-locking means for automatically locking said seat against linear movement relative to said base;

j. each of said locking means comprising interengageable fixed and movable locking elements;

k. a single, manually operable control means;

l. three connecting means respectively directly connecting said movable locking elements to said single control means; and

m. whereby said single control means unlocks all of said locking means.

7. A chair as defined in claim 6 wherein said connecting means respectively include mechanical linkages respectively connected to said movable locking elements and all connected to said single control means.

8. A chair as set forth in claim 7 wherein those two of said linkages which are connected to said movable locking elements of said substructure and base-locking means include in common:

a. a rod reciprocable along said upright axis of said swivel means and having its lower end connected to said movable locking elements of said substructure and base-locking means; and

b. rod-shifting means connected to the upper end of said rod and operable by said single control means for axially shifting said rod to disengage said movable locking elements of said substructure and base-locking means from said fixed locking elements thereof.

9. A chair comprising:

a. a substructure;

b. a base carried by said substructure;

c. swivel means interconnecting said base and said substructure and providing for swiveling movement of said base relative to said substructure about an upright axis;

d. a seat carried by said base and capable of being oriented in a selected direction by swiveling of said base relative to said substructure about said upright axis;

e. track means interconnecting said seat and said base and providing for linear movement of said seat relative to said base in a direction dependent on the selected orientation of said seat;

f. an upright seat back connected to said seat so as to be capable of swiveling and linear movement therewith; and

g. whereby said seat and said seat back can be swiveled to a desired orientation and moved linearly along that orientation by a person seated on said seat with said seat back upright.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,622,202 Dated November 23, 1971

Inventor(s) Vernon C. Brown

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3: line 13, "7&-7" should be --7-7--.

Column 8: line 37, (Claim 1), "fore-and-aft" (first occurrence) should be --In a chair--.

Column 8: line 38, (Claim 1), "fore-and-aft" should be --swivelling movement and--.

Column 9: line 26, (Claim 5), "interconnection" should be --interconnecting--.

Signed and sealed this 23rd day of May 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents