

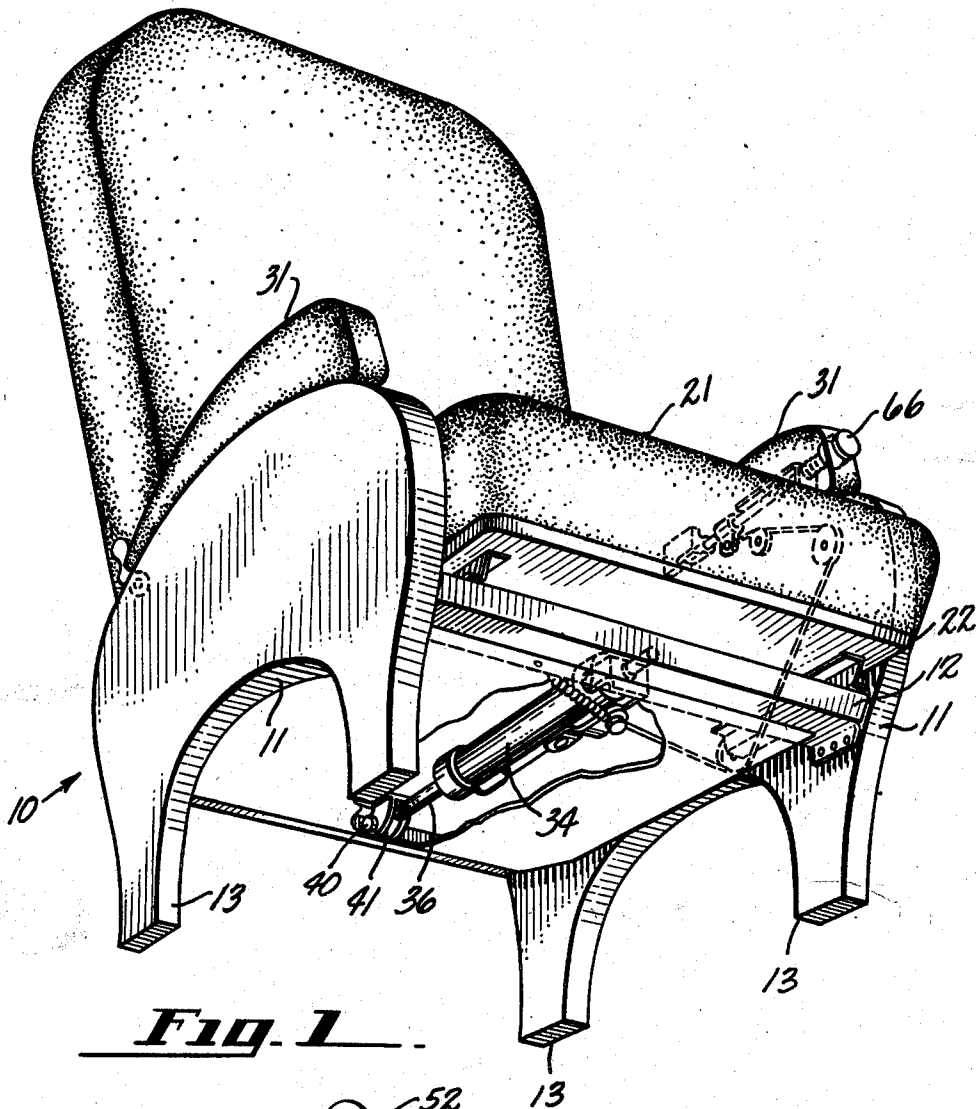
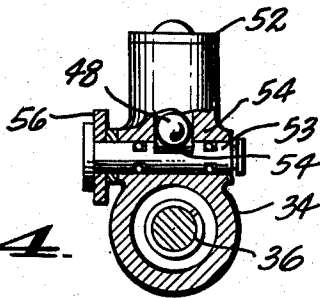
Sept. 12, 1950

A. D. ARMSTRONG
RECLINING CHAIR

2,522,246

Filed Aug. 28, 1945

4 Sheets-Sheet 1



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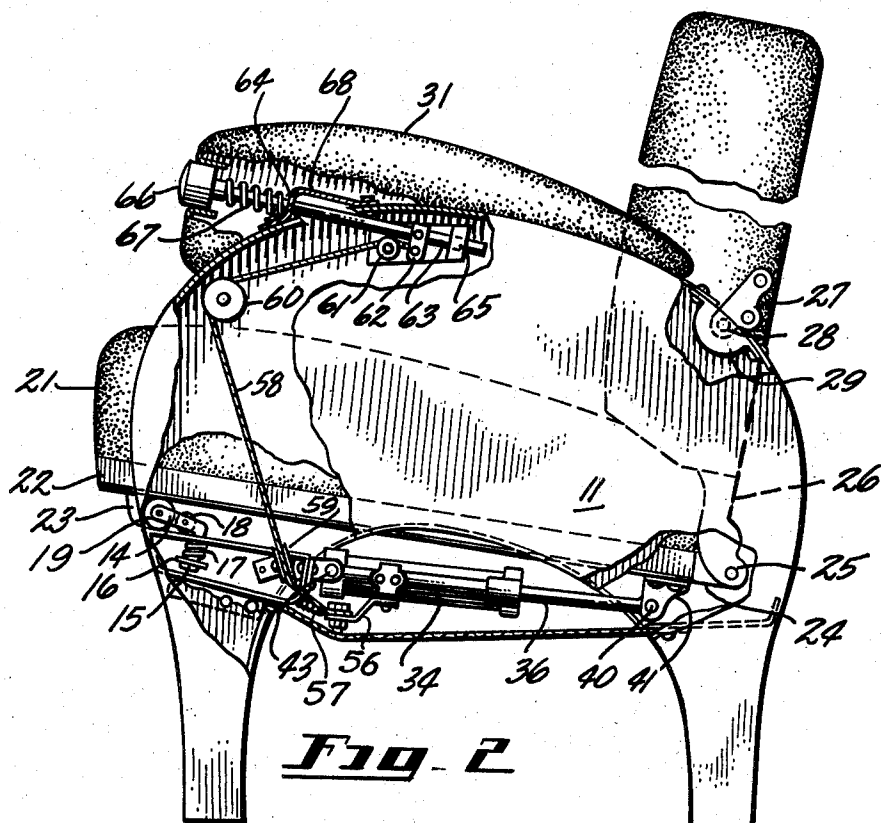
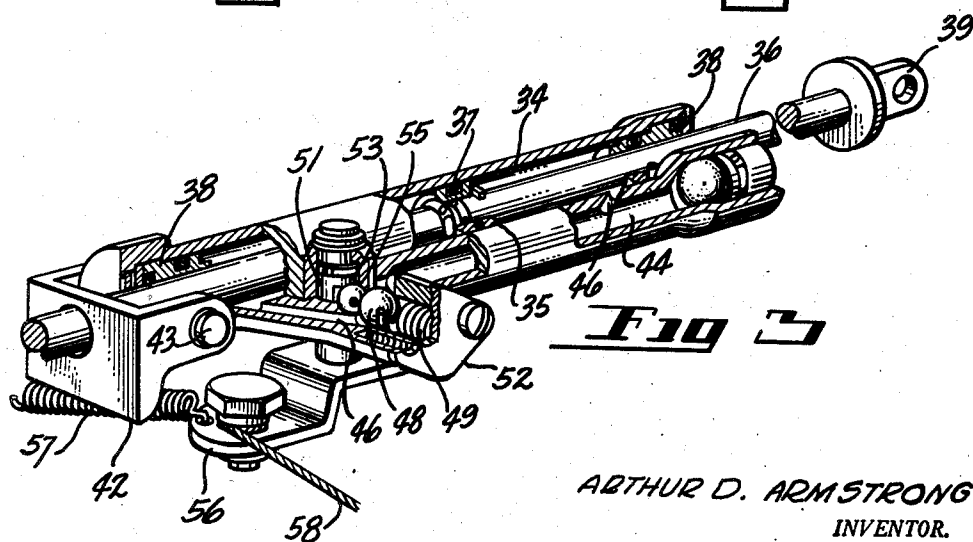
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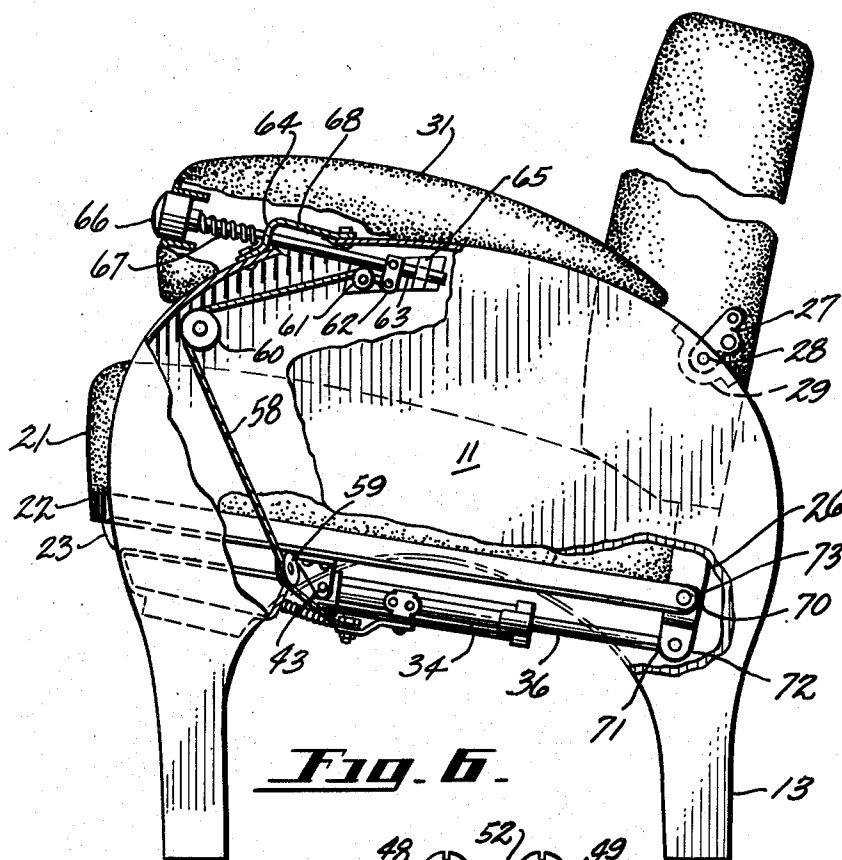


Fig. 6.

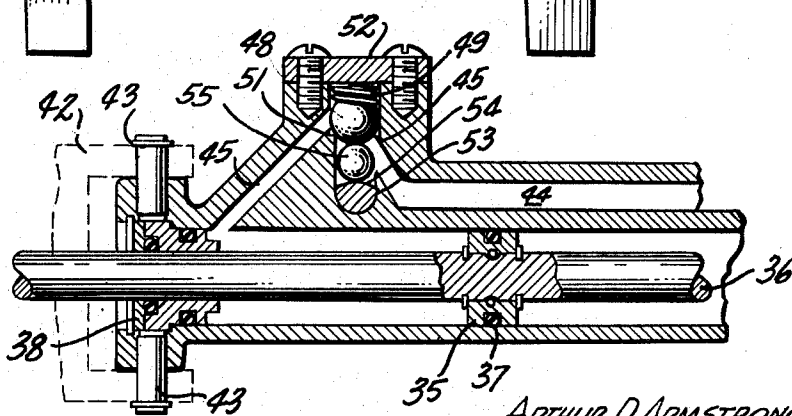


Fig. 5.

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4 Sheets-Sheet 4

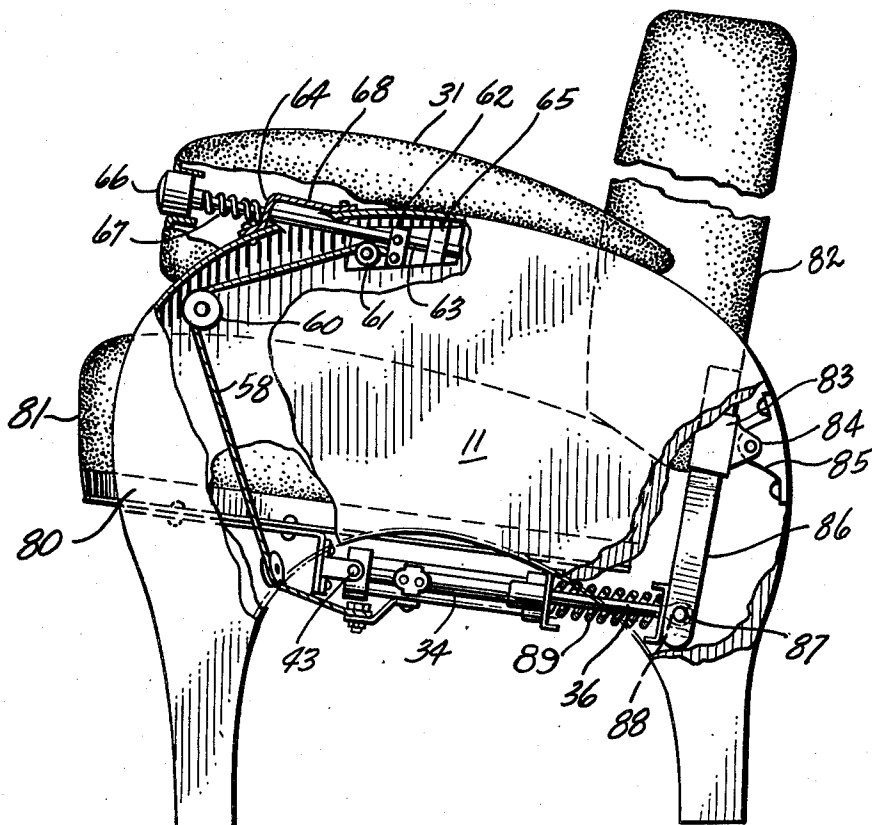


Fig. 2.

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RECLINING CHAIR

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12 Claims. (Cl. 155—116)

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This invention relates to adjustable chairs, and more particularly to such a chair having means for locking the chair in any desired position of adjustment.

Adjustable chairs provided with means for locking the same in some positions of adjustment have been heretofore proposed. These prior chairs were objectionable for a number of reasons. The principal objection to the chairs previously proposed was that the locking devices did not lock the chairs in any desired position of adjustment, but merely in one of a plurality of positions.

The locking devices of prior chairs generally consisted of a plurality of detents carried by one movable element of the chair and a dog or the like formed on another element, which when engaged in any one of the detents held the two elements against relative movement. The positions of adjustment of the chair were fixed by the relative disposition of the detents, and oftentimes a user found that the more comfortable position of the chair was one in which the dog was disposed between two adjacent detents and the chair could not be locked in the position desired. In such cases the user was forced to adjust the chair until the dog engaged one or the other of the two adjacent detents.

Attempts to remedy this defect were made by increasing the number of detents, but little success was had as it was found that if the number of detents was increased and more closely spaced, the lock did not have the strength sufficient to withstand the stresses set up therein in use. This was particularly true where the chairs were used in railway cars, buses, and aircraft where changes in acceleration or momentum of the vehicle caused high transient stresses in the lock.

Efforts to obviate these difficulties by proposing frictional locks were also unsuccessful, as it was found that the service life of such locks was quite short, and the locking action was not sufficiently positive to warrant their use in public conveyances.

The present invention obviates the difficulties had with prior locking devices as adjustable body supporting members of the chair of the present invention will remain in any adjusted position desired. The locking device of the chair herein shown is positive in action and will take even those abnormally high transient loads to which chairs are subjected in railway cars, buses, aircraft and like public conveyances.

In one embodiment of the chair of the present

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invention, a seat rest is pivotally connected at the lower end thereof to a back rest for supporting the back of the user. The back rest is pivotally carried by a suitable frame to be fixed to a support such as the floor and as the front edge of the seat rest is supported for movement longitudinally of the same, the relative position of the seat and back rest can be adjusted.

In another embodiment of the chair of the present invention, the seat rest is fixed against movement longitudinally of the chair while the back rest is supported for pivotal movement. As one body supporting member is movable the relative positions of the body supporting members can be adjusted to accommodate different users.

The locking device of the chair of the present invention comprises a hydraulic cylinder and a piston operating therein connected respectively to relatively movable elements of the chair. The cylinder is provided with a passage extending from one end of the same to the other in which is mounted a manually controllable valve. The passage forms a bypass around the piston of the locking device so that when the valve is open the seat and back rest may move relative to each other, the fluid in the cylinder being forced by movement of the piston from the cylinder on one side of the piston through the bypass passage and back to the cylinder on the other side of the piston.

The valve in the bypass passage is normally held closed but may be opened by the user through a suitable mechanism having an operator located on a portion of the chair convenient to the user. As the fluid filling the cylinder is non-compressible, the chair will be locked against movement as long as the valve is closed, and the chair will be held in any desired position.

To permit an adjustment of the chair it is only necessary to operate the valve controlling mechanism to open the valve, after which the chair may be adjusted by merely applying forces to a movable element of the chair.

In one embodiment of the present invention the cylinder is supported by the frame of the chair and the end of the rod of the piston is pivotally connected to the seat rest. As the seat rest is held against movement relative to the frame by the cylinder and piston, the back rest cannot be moved and consequently the chair will be securely locked against accidental movement from a desired adjusted position.

In another embodiment of the invention here-

in disclosed, the cylinder is carried by the seat rest and the piston rod connected to the back rest. Thus as two relatively movable body supporting members of the chair are interconnected by the cylinder and piston no accidental relative movement can occur as long as the valve controlling the flow of fluid through the bypass is closed.

In the embodiments of the present invention herein shown, the valve is normally held closed by a spring and is so constructed and arranged that any force tending to recline the chair causes the fluid of the cylinder to augment the normal action of the spring. The valve, however, will open against the action of the spring if a relatively large force is exerted against the back rest in the direction necessary to move the chair to an upright position. Thus a user or an attendant, if the chair is used in a public conveyance, can move the chair to an upright position without the necessity of opening the valve by merely urging the back rest to the upright position.

Other features and advantages of the present invention will be apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view from below of one form of the chair of the present invention with certain parts in section and certain parts broken away to more clearly illustrate the locking device of the chair with parts of the locking device shown in phantom;

Figure 2 is an elevational view of the form of the chair shown in Figure 1 with certain parts in section and certain parts broken away to more clearly illustrate the invention;

Figure 3 is a view partly in section and partly in elevation of the locking device of the chair of the present invention;

Figure 4 is a sectional view taken along line 4-4 of Figure 3;

Figure 5 is a sectional view of a fragmentary part of the locking device of the present invention;

Figure 6 is a view similar to Figure 2 but showing a modified form of the chair of the present invention; and

Figure 7 is another view similar to Figure 2 but showing a still further modified form of the chair of the present invention.

The chair of the present invention, referring now to the drawing, and particularly to Figure 1 thereof, comprises a frame 10, formed of side members 11 rigidly interconnected by cross members 12. Each side member 11 terminates in a pair of supporting legs 13 which may be provided with some means not shown for securing the same to the floor or other supporting structure.

The front cross member 12 carries a pair of substantially L-shaped brackets 14, and in the preferred form of the present invention the one arm of each bracket is slidably mounted in an aperture formed in the cross member 12. The lower end of this arm is formed with a head 15 on which seats a large washer 16 forming a shoulder for receiving a coiled spring 17. The spring surrounds the portion of the arm extending through the aperture and acts against the underneath surface of the front cross member 11 to normally urge the washer and the arm carrying the same downwardly, as viewed in Figure 2.

The other arm of the bracket extends forwardly of the aperture and carries intermediate the

ends thereof a roller 18 which is resiliently held down by the spring 17 against the upper surface of the front cross member. A larger roller 19 is rotatably mounted to the end of each of the arms carried above the front cross member, and serves to slidably support a seat member 21. The frame 22 of the seat member 21 is formed on the underneath surface thereof with a pair of spaced parallel tracks 23 for operating over the larger rollers 19.

The rear edge portion of the seat frame 22 is provided with a pair of ears 24 at the opposite sides thereof to which are pivotally connected, respectively, spaced lugs 25 formed at opposite sides of the lower portion of a back rest frame 26. The ears may be pivotally connected to the lugs 25 by any means desired, such as a suitable pivot pin.

Rigidly secured to opposite sides of the back rest frame 26, intermediate the ends thereof, are a pair of brackets 27, each carrying a suitable pin 28 for pivotally mounting the back rest frame between the upper portions of the side member 11 of the frame 10. As shown, the pins 28 are mounted in brackets 29 carried by the side members 11.

It will now be seen that as the seat is pivotally connected to the back rest, which in turn is pivotally carried by the side members 11, movement of the seat over the rollers 19 will bring about a pivotal movement of the back rest. Thus it will be seen that the relative position of the seat and the back rest can be adjusted by a user merely by shifting the position of the seat relative to the frame.

The side members 11 of the frame 10 carry suitable arm rests 31 which may be padded and covered with any material desired, depending upon the use to which the chair is to be put. It should be understood now that the seat member 21, as well as the back rest, is also padded and upholstered with some material suitable for a covering in the intended use of the chair.

To hold or lock the body supporting members in any desired position of adjustment, the present invention provides a hydraulic locking element which in one illustrative embodiment of the invention comprises a fluid filled cylinder 34 pivotally connected to the frame 10, and a piston 35 connected through a rod and a pivotal connection to the frame 22 of the seat 21. In the form of the invention illustrated, the piston 35 comprises an annular member fixed in any manner desired to an elongate rod 36 intermediate the ends thereof. The piston is formed with a circumferential groove which carries an O-ring 37 to effectively seal the sliding seat between the wall of the cylinder and the piston. The rod 36 extends outwardly of both ends of the cylinder which are sealed against leakage by sealed bearings 38. The one end of the piston rod 36 carries a connection member 39 formed with an eye for freely receiving a headed pin 40 adapted to be passed through aligned apertures in an eared bracket 41 rigidly fixed to the frame 22 of the seat 21. The pin 40 is held against removal from the bracket by any conventional means such as peening the projecting end of the same.

The cylinder housing carries at the one end thereof a mounting fixture 42. The fixture can be secured to the cylinder housing in any manner desired as long as the fixture is free to rotate or rock relative to the housing. In the form of the invention illustrated the housing is pro-

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vided with a pair of oppositely directed pins 43 for reception in aligned openings formed in the fixture. The outer ends of the pins are formed with circumferential grooves for anchoring resilient retaining rings. In the form of the invention illustrated in Figures 1 and 2, the mounting fixture 42 is rigidly secured by riveting or some similar operation to the front cross member 12 of the frame 10.

The cylinder is completely filled with some suitable fluid which is non-compressible, and it will be seen that as the cylinder is connected to the cross member of the frame 10, and the rod 36 of the piston 35 to the frame 22 of the seat member, no relative movement of the seat and back rest can occur.

To permit conjoint movement of the body supporting members, means are provided in the present invention for by-passing the piston 35 so that the same can be moved relative to the cylinder. Although any means desired can be provided for by-passing the piston, in the form of the invention illustrated, this means comprises a passageway 44 extending substantially the length of the cylindrical housing, and communicating with the cylinder through ports 45 and 46. The port 45 is formed in an enlarged portion of the cylinder housing and its course extends outwardly from the cylinder and then leads to the one end of the same. The purpose of this construction will be hereinafter more fully explained. The ports 45 and 46, as well as the passageway 44, are filled with the liquid of the cylinder.

As the ports lead from the passageway 44 to opposite ends of the cylinder the liquid may pass from the cylinder through one port into the passageway and then return through the other of the ports to the cylinder. It will thus be seen that as long as fluid may pass through the one port and passageway and return to the cylinder through the other of the ports, the piston is free to move relative to the cylinder.

To prevent the flow of liquid except when it is desired to adjust the relative position of the seat and back rest of the chair, a valve is interposed intermediate the ends of the port 45. The valve, as best seen in Figures 3 and 5, comprises a ball 48 normally held by a spring 49 on a spherical seat 51. The spring, disposed in the enlarged portion of the housing, is retained in resilient engagement with the ball 48 by means of a small plate 52 fixed to the side wall of the cylindrical housing.

To open the valve and to cause the ball 48 to move upwardly of its seat against the action of the spring 49, a small shaft 53 is rotatably mounted within the cylinder housing. The shaft is formed with a cut-away portion having a cylindrical surface 54, the major axis of which is displaced from the axis of the shaft so that when the surface 54 is engaged by a second ball 55, the ball 48 is held on the seat 51. When the shaft 53, however, is rotated to move the surface 54 out of engagement with the ball 55, the cam formed by the cylindrical surface of the shaft 53 cams the ball 55 upwardly, as viewed in Figure 5, and forces the ball 48 from its seat 51. Fluid is now free to pass from the one end of the cylinder through the port 45 into the passageway 44 or from the other end of the cylinder into the passageway 44 through the port 46. As the liquid of the cylinder can be thus displaced, the piston can move relatively to the cylinder and the chair adjusted.

An operating arm 56 is fixed to one end of the

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shaft 53 and is normally held in a position in which the surface 54 is engaging the ball 55 by a spring 57 connected at one end to the operating lever 56 and at the other end to the front cross member 12 of the frame 10.

So that an occupant of the chair may conveniently manipulate the operating arm 56, a flexible cable 58 has one end thereof fixed to the operating arm 56 and the other end is passed over the pulleys 59, 60 and 61 and secured to a finger 62 carried by a push-rod 63 mounted in one arm rest of the chair for reciprocal movement. The push-rod is journaled in the arm rest and one side member 11 of the frame 10 of the chair by bearing members 64 and 65, respectively. The outer end of the push rod 63 is formed with an operating button 66, which is normally held substantially flush with the front surface of the arm rest by a spring 67, coiled about the front end of the push-rod 63 and disposed between the operating knob 66 and a bracket 68 which carries the bearing member 64.

It should now be seen that if an occupant pushes the operating knob 66 inwardly of the arm rest the finger 62, carried by the push-rod 63, will draw the flexible cable 58 rearwardly and move the operating arm 56 to rotate the shaft 53 to a position in which the surface 54 is out of engagement with the ball 55. As heretofore explained, this movement of the shaft cams the ball 55 upwardly to force the ball 48 off its seat 51. As soon as the ball 48 is forced off its seat, the piston is free to move longitudinally of the cylinder, and the seat and back rest are released for conjoint movement to any desired position of adjustment. After the seat and back rest have been moved to the particular position of adjustment desired by the occupant, the operating knob 66 is released, whereupon the spring 67 returns the push-rod to its normal position and the spring 57 returns the operating lever 56 to the position in which the surface 54 of the shaft 53 is again engaging the ball 55. The spring 49 is now free to move the ball 48 back upon its seat 51, and the by-pass being again closed, no relative movement can occur between the piston and the cylinder. The movement elements of the chair are now locked against movement.

It will be seen, referring now to Figure 5, that any movement of the piston rod to the left, as viewed in the figure referred to, will cause the liquid in the port 45 to more tightly force the ball 48 against the seat 51 and thereby augment the action of the spring 49. The cylinder is connected to the chair to take advantage of this feature and all forces exerted against the back rest which tend to move the same toward the reclined position will cause the ball to more tightly engage its seat.

It should be seen, however, that if sufficient pressure is created on the underside of the ball 48, as viewed in Figure 5, the ball can be forced off the seat without rotation of the shaft 53. This is a feature of the lock of the chair of the present invention for the chair can thus be moved from a reclining to an erect position without first opening the by-pass valve. This feature of the chair is particularly important where the chair is used in a public conveyance such as an aircraft or the like for a stewardess or other attendant can move all chairs in the airplane to a uniform erect position merely by urging the seat rest to an upright position. The force necessary to urge

the ball 48 off its seat is relatively large but it will be noted that the force applied to the top edge of the back rest is magnified by the lever arm formed by the pivotally mounted back rest so that a relative small force will create the pressure in liquid necessary to urge the ball off its seat.

It should be understood now that the locking device of the chair of the present invention will actually hold the body supporting members of the chair in any position of adjustment desired. The positions of adjustment are infinitesimal and are not limited to any mechanical spacing of elements of the locking device as in the prior proposed chairs. The locking device of the present invention is positive in action but yet can be easily released when it is desired to adjust the relative position of the seat and back member of the chair.

The chair of the present invention is much easier to adjust than chairs heretofore proposed and supplied with some mechanical locking means, for there is considerably less friction between the cylinder and piston than there is between the movable elements of the prior mechanical locks.

In the embodiment of the invention illustrated in Figures 1 and 2, the cylinder has been shown secured to the front cross member of the chair, and the piston rod pivotally fixed by means of the angle member 41 to the frame 22 of the seat member. It is obvious that this relationship could be reversed and the same desirable results obtained, for in the broadest aspects of the present invention it is merely necessary that the hydraulic locking device interconnect two relatively movable body supporting members of the chair.

In the embodiment of the invention shown in Figure 6, the chair illustrated is substantially identical with the chair heretofore described, and the same reference characters have been applied to elements common in both chairs. In this form of the invention, the cylinder is pivotally mounted to the frame 22 of the seat member 21 and the piston rod is secured to an extension member 70 carried by the back rest frame 71. The piston rod in this embodiment of the invention can be formed with a bifurcated connection member 72 having a pair of aligned apertures formed therein for receiving oppositely directed pins 73 carried by the extension member 70 of the back rest frame 71.

It should be understood that the cylinder and piston of the chair illustrated in Figure 6 hold the body supporting members against relative movement as in the earlier described form of the chair, and that the opening of the valve normally closing the by-pass conduit permits the seat member and back rest to be relatively adjusted.

In the form of the chair of the present invention illustrated in Figure 7 the frame 80 of the seat member 81 is fixed to the frame of the chair. The frame 82 of the back rest in this embodiment of the invention is provided at each side thereof with a bracket 93 which is formed with a bifurcated lug 94 having a pair of aligned apertures receiving the opposite ends of a suitable pivot pin carried by a journal bracket 95 fixed to each side member 11.

The back rest frame 82 is formed at the lower edge thereof with a downwardly extending arm 86 intermediate the opposite side edges thereof. The arm carries a pin 87 and the opposite ends of this pin are held in aligned apertures formed in a bifurcated connection member 88 carried by

the piston rod 36 of the hydraulic unit heretofore described.

The cylinder and piston as long as the by-pass is closed by the occupant-operated valve as in the earlier described forms of the invention holds the body supporting members of the chair against relative movement but yet permits ready adjustment as soon as the valve is opened to permit oil to flow through the by-pass conduit.

In this embodiment of the chair of the present invention, a coil spring 89 sleeving the piston rod 36 is interposed between the one end of the cylinder 34 and the arm 86. It will be seen that the spring 89 normally tends to urge the back rest frame 82 to an upright position such as illustrated in Figure 7. Thus a steward or other attendant of a public conveyance equipped with chairs of this embodiment of the present invention can by merely actuating the button 66 of each chair cause all chairs to assume identical positions with the back rests in an upright position such as illustrated in the figure referred to above.

It will now be seen that in all illustrated embodiments of the present invention the body supporting members of the chair herein disclosed can be held in any relative position of adjustment desired. The positions of adjustment of the chair are in no way limited by the locking device of the chair yet the locking device is positive in action and readily released when it is desired to adjust the body supporting members of the chair.

Although the now preferred embodiments of the present invention have been shown and described herein, it is to be understood that the invention is not to be limited thereto, for it is susceptible to changes in form and detail within the scope of the appended claims.

I claim:

1. In an adjustable chair of the type described, a frame; a seat member slidably mounted thereon; a back rest pivotally supported by said frame; means for pivotally interconnecting said seat member and back rest for conjoint movement; a cylinder; a piston operating in said cylinder, said cylinder and piston interconnecting two relatively movable elements of said chair, said cylinder being completely filled with a non-compressible fluid whereby said seat member and back rest are held against movement relative to said frame means for conducting the fluid held by said cylinder from one end thereof to the other so that said piston may move relative to said cylinder when an occupant of said chair desires to change the relative position of said back rest and seat member; and means operable by said occupant for controlling said last-named means.

2. An adjustable chair of the type described comprising a frame; a seat member mounted on said frame for reciprocal movement; a back rest; means for pivotally mounting said back rest to said frame; means for pivotally connecting said seat member to said back rest so that movement of said seat member causes movement of said back rest; a cylinder; means for connecting said cylinder to said seat member; a piston operating in said cylinder and having a rod connected to said back rest; a non-compressible fluid completely filling said cylinder; a passageway extending from one side of said piston to the opposite side of the same; a valve normally closing said passage; and means for opening said valve to permit movement of said seat member, said

last-named means including means on said frame and convenient to an occupant of the chair.

3. An adjustable chair of the type described comprising a frame; a seat member mounted on said frame for reciprocal movement; a back rest; means for pivotally mounting said back rest to said frame; means for pivotally connecting said seat member to said back rest so that movement of said seat member causes movement of said back rest; a cylinder; a piston operating in said cylinder; means for connecting said cylinder and piston between a pair of relatively movable members of said chair; a non-compressible fluid completely filling said cylinder and holding said piston against movement therein; and means controlled by the occupant of said chair for bypassing the fluid around said piston whereby said fluid may pass from one side of said piston to the other side of the same thereby releasing the members of said chair for relative movement.

4. In an adjustable chair of the type described, a frame; a seat member mounted thereon; a back rest pivotally supported by said frame; a cylinder; a piston operating in said cylinder, said cylinder and piston interconnecting said back rest and the frame of said chair, said cylinder being completely filled with a non-compressible fluid whereby said back rest may be held against movement relative to said frame; a bypass means around said piston; means normally closing said bypass means; and means, including means mounted on said chair convenient to the occupant thereof and adapted to be operated by said occupant, for rendering said last-named means inoperative so that said piston may move relative to said cylinder to permit the occupant to change the angular position of said back rest relative to said seat member.

5. In an adjustable chair of the type described, a frame; a seat member mounted thereon; a back rest; means for pivotally mounting said back rest to said frame for movement relative to said frame and seat member; a liquid filled cylinder; a piston operating in said cylinder, said cylinder and piston interconnecting and holding said seat member and back rest against relative movement; a bypass interconnecting opposite ends of said cylinder whereby the liquid of the cylinder may flow from one side of said piston to the other when the occupant of said chair desires to change the relative position of said seat member and back rest and a force is applied to said piston; and means under the control of said occupant for closing said bypass to hold said piston against movement relative to said cylinder and lock said back rest in a desired position of adjustment relative to said seat member.

6. In an adjustable chair of the type described, a frame; a seat member; a back rest; means for pivotally interconnecting said seat and back rest to said frame for relative movement; means including a liquid filled cylinder and piston operating in said cylinder, said cylinder and piston interconnecting and holding said seat and back rest against relative movement; liquid bypass means interconnecting opposite ends of said cylinder; means for closing said bypass means; and means under the control of the occupant of said chair for opening said bypass means whereby the liquid of the cylinder may flow from one side of said piston to the other when a force is applied to said piston to permit the occupant of said chair to relatively adjust said seat member and back rest.

7. An adjustable chair of the type described

comprising a frame; a seat member mounted on said frame; a back rest; means for pivotally mounting said back rest to said frame; a cylinder; means for connecting said cylinder to said seat member; a piston in said cylinder, said piston having a rod connected to said back member; a non-compressible fluid completely filling said cylinder; a passageway extending from one side of said piston to the opposite side of the same; a valve normally closing said passageway; and means for opening said valve to open said passageway to the flow of fluid to permit movement of said back rest relative to said seat member, said last-named means including means on said frame and convenient to an occupant of the chair for operation by said occupant.

8. An adjustable chair of the type described comprising a frame; a seat member mounted on said frame for reciprocal movement; a back rest; means for pivotally mounting said back rest to said frame; means for pivotally connecting said seat member to said back rest so that movement of said seat member causes movement of said back rest; a cylinder; means for connecting said cylinder to said frame; a piston operating in said cylinder and having a rod connected to said back rest; a non-compressible fluid completely filling said cylinder; means, including a passage, for flowing fluid from one end of said cylinder to the opposite end when said seat member is moved; and means for closing said passage to the flow of fluid to lock said seat member against movement relative to said back rest.

9. In an adjustable chair of the type described, a frame; a seat member; a back rest; means for mounting said seat member and back rest to said frame for relative movement; a liquid-filled cylinder; a piston operating in said cylinder; a rod carried by said piston projecting outwardly of said cylinder; means for connecting said cylinder to said frame; means for connecting an end of said rod to said back rest; a passageway interconnecting opposite ends of said cylinder; a valve in said passageway; resilient means urging said valve to a position closing said passageway to the flow of liquid; means for opening said valve against the action of said resilient means to open said passageway whereby said piston may move relative to said cylinder; and means mounted on said chair convenient to an occupant of the same for operating said valve opening means when it is desired to change the relative position of said back rest and said seat member.

10. An adjustable chair of the type described comprising a frame; a seat member mounted on said frame; a back rest; means for pivotally mounting said back rest to said frame so that the angular position of said back rest may be changed relative to said seat member; a cylinder; means for connecting said cylinder to said chair; a piston operating in said cylinder and having a rod connected to said back rest; a non-compressible fluid completely filling said cylinder; a passageway extending from one side of said piston to the opposite side of the same so that said fluid may flow from one side of said piston to the other side thereof upon a force being exerted against said back rest; means normally closing said passageway to the flow of fluid whereby said cylinder and piston are normally held against relative movement to lock said back rest against movement; means, including means mounted on said chair convenient to the occupant thereof and adapted to be operated by said occupant, for rendering said last-named means in-

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operative so that said piston may move relative to said cylinder to permit the occupant to change the angular position of said back rest relative to said seat member; and a coil spring sleeving said rod and normally tending to urge said back rest to an upright position whereby said back rest when the chair is not in use will be returned to an upright position from any adjusted angular position by operation of said occupant-operated means.

11. An adjustable chair of the type described, comprising: a frame; a pair of relatively movable body-supporting members mounted thereon; a cylinder; means for mounting said cylinder to the underside of said chair; a piston operating in said cylinder; means for connecting said piston to one of said body-supporting members movable relative to said frame; said cylinder being completely filled with a non-compressible liquid for holding said piston against displacement therein whereby said body-supporting elements are held against relative movement; a by-pass means around said piston valve; means normally closing said by-pass means to the flow of liquid; and means, including means mounted on said chair convenient to the occupant thereof and operable by said occupant, for rendering said valve means operative to open the by-pass means to liquid flow thereby permitting said piston to move within said cylinder and the body-supporting members relative to each other.

12. An adjustable chair of the type described, comprising: a frame; a back rest angularly extending upwardly from said frame; means for mounting said back rest to said frame for movement relative thereto whereby the angular relationship between said frame and back rest can be varied; a cylinder carried by said chair; a

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piston operating in said cylinder; said cylinder being completely filled with a non-compressible liquid whereby said piston may be held against movement within said cylinder; means for interconnecting said piston and said back rest whereby said back rest may be held against movement relative to said frame; a fluid passageway interconnecting opposite end portions of said cylinder wherein fluid may flow from one side of the piston to the other as the piston is moved relative to the cylinder; a valve normally closing said passageway; and means for operating said valve to open said passageway to the flow of liquid to permit movement of said piston relative to said cylinder whereby said back rest may be moved relative to said frame, said last-named means including means on said frame and convenient to an occupant of the chair for operation by said occupant.

ARTHUR D. ARMSTRONG.

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