June 4, 1968 P. J. WILLIAMS 3,386,770

DOUBLE ACTION CHAIR CONTROL

Filed Sept. 18 1967

FIG. 1.

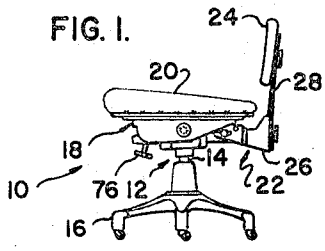
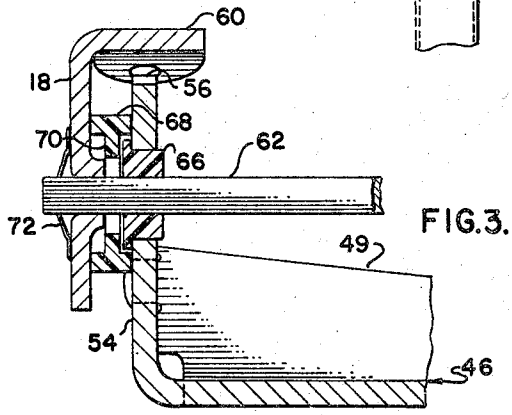


FIG. 2.

FIG. 3.



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DOUBLE ACTION CHAIR CONTROL

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ABSTRACT OF THE DISCLOSURE

The following specification described a chair control using a single torsion bar to permit resilient backward tilting of the back and resilient forward tilting of the seat relative the chair control frame.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates in general to torsion bar chair controls and more particularly to an improved torsion bar chair control permitting resilient forward tilting of the seat relative the frame or post as well as resilient rearward tilting of the chair back relative the frame or post.

Description of the prior art

Conventional torsion bar chair controls permit the chair back to be resiliently tilted or pivoted backwards relative the vertical axis of the chair frame or post. Backward tilting of the chair back provides comfortable seating postures when the occupant leans backwards, however, when leaning forward, the seat remains stationary in a generally horizontal plane. With the seat horizontal, the number of comfortable forward leaning positions taken by the occupant is limited. Where frequent or extensive forward leaning positions are required, such as by doctors, draftsmen or people in other professions, this situation often becomes a nuisance.

Summary of the invention

It is therefore proposed to economically remedy this situation by enabling the seat to tilt forward independently of the chair frame in response to a forward leaning motion on the part of the chair occupant. On the other hand, when the chair occupant leans backward, the chair seat is held stationary in a generally horizontal position and the back tilts backwards.

The remedy is accomplished by modifying a torsion bar chair control of the type shown in U.S. Patents 3,136,580 and 3,250,567, issued to Parrott, to divorce the seat support from the frame on forward leaning motion of the chair occupant. The seat pivots forward independently of the frame through a desired angle under resilient resistance of the torsion bar which is held through the relationship between the back support and frame. But on rearward leaning movement, the seat support engages the frame so that the chair back pivots rearwardly under resilient resistance of the same torsion bar, which is then held through the relationship of the seat support and frame.

It is therefore an object of the present invention to provide an improved chair control in which the back tilts on rearward movement of the occupant and the seat tilts independently of the back on a forward leaning movement of the occupant.

It is a further object of the present invention to provide an economical chair control utilizing a single torsion bar to permit resilient forward tilting of the seat independently of the frame and resilient backward tilting of the back independently of the frame.

Other objects and features of the present invention will become apparent on examination of the following specification and claims together with the drawings.

Description of the drawings

FIG. 1 is a side elevational view of a chair utilizing the principles of the present invention;

FIG. 2 is an isometric view partially exploded to illustrate the invention; and

FIG. 3 is a fragmentary sectional view taken along the line 3—3 of FIG. 2.

Description of the preferred embodiment

Referring to FIG. 1, a chair is illustrated therein by the reference character 10. It will be understood that chair 10 can be in the form of a drafting stool or other support frame in which the occupant often is required to lean forward.

The chair 10 comprises a chair control indicated at 12 and illustrated in greater detail in FIG. 2. The chair control is in turn supported on a post 14 carried by a pedestal 16. The chair control 12 comprises a seat support 18 carrying a chair seat 20 and a back support 22 carrying a chair back 24.

The back support 22 comprises a U-shaped bracket 26 carrying a vertically arranged arm 28 to which the back 24 is fastened. The arm 28 is adjustably nested in a recess of the back leg of the bracket 26 to permit height adjustment of the back and is attached thereto by a bolt 30 and a fastener (not shown). The side legs of bracket 26 are adjustably secured to a pair of spaced plates 32 by means of a spacer shaft and sleeve 34 and a lock adjustment assembly 36 similar to that seen in U.S. Patents No. 2,093,319 and 3,240,528. Plates 32 are interconnected by an integrally formed back wall 38 adjacent their front end.

The spaced plates 32 and wall 38 are nested adjacent their front end between the side legs 42 of U-shaped frame bracket 44. The frame bracket 44 and a U-shaped frame member 46 form a frame with the back legs of the bracket 44 and frame member 46 staked together and to a post receiving member 48. The post receiving member 48 receives the post 14 so that the axes of the post 14 and frame member 46 are fixed relative each other. The elongate axis of the U-shaped frame member 46 is arranged perpendicular to the elongate axis of the side plates 32 with the bracket 44 nested within the side legs 49 and 50 of the frame member 46. The side plates 32 and wall 38 are nested in a recess 52 of leg 50 intermediate the ends of the leg 50 so that the upper wall of recess 52 serves as a stop for rotation of plates 32 and wall 38 in a counterclockwise direction, as seen in FIGS. 1 and 2.

The back leg of the frame member 46 is somewhat longer than the side legs 49 and 50 and the extending ends of the back leg are turned up to form end legs 54 for the frame member projecting above the level of the side legs 49 and 50. The end legs 54 are staked and welded to the adjacent side legs 49 and 50 to rigidize the frame member 46. Each end leg 54 has a top stop surface 56, which is generally horizontal and which is bevelled downwardly adjacent the forward end at about 12° to form a second stop surface 58.

The seat support 18 comprises a pair of L-shaped arms whose elongate axes are generally horizontal with one leg portion 60 of each arm being fastened to the seat 20 and overlying a respective one of the end legs 54 and the adjacent stop surfaces 56 and 58.

A torsion bar 62 having a rectangular or other noncircular cross section passes through the plates 32, side legs 42 of bracket 44 and end legs 54 to nonrotatably engage

a respective correspondingly shaped aperture 64 in the vertical leg portion of each L-shaped seat support arm 18. The plates 32, side legs 42 of bracket 44 and end legs 54 are rotatably supported relative the torsion bar by a respective flanged bushing 66 as explained in the aforementioned Parrott Patents. An annular nylon spacer element 68 having a depending annular wall 70 intermediate its ends and abutting one side of bushing 66 in the end legs 46 serves to space respective arms 18 from the end legs 54 as best seen in FIG. 3. End lock washers 72 prevent axial movement of the bar 62.

A torque lever 74 is nonrotatably connected to the torsion bar 62 intermediate the side plates 32 and it projects forwardly from the bar for engagement with the end of an adjusting screw 76. Screw 76 is threaded through the interconnecting wall 38 between plates 32 so that a predetermined degree of tension is placed on the bar 62 and rotation of the back support in a clockwise direction, as seen in FIGS. 1 and 2, tensions the bar 62.

On leaning backward an occupant of the chair causes the back 24, arm 28, bracket 26 and plates 32 to rotate or tilt clockwise as seen in FIGS. 1 and 2, thereby applying pressure through the screw 76 and the torque lever 74 as soon as the seat support 18 engages the stop surfaces 56 on the end legs 54 of the frame member 46. The stop surfaces 56 are engaged by arms 18 after relatively minute travel of 3° to 5° so that the continued pressure against the back torques the bar 62 from the center to both ends for resiliently resisting the backward leaning movement.

On leaning forward the seat support 18 is rotated in the counterclockwise direction as seen in FIGS. 1 and 2 for a maxium of 12° until arms 18 engage stop surfaces 58. The ends of bar 62 being nonrotatably secured to the seat support 18 therefore twist from the opposite ends to the center since the torque lever 74 is held by the adjusting screw 76 passing through the wall 38, which is held from counterclockwise rotation by side leg 50 of frame member 46. Pivoting of the seat forward is terminated when the seat support 18 engages the stop surfaces 58 of the frame member 46.

The foregoing constitutes a description of an improved chair control whose inventive concepts are believed set forth in the following claims.

What is claimed is:

1. A chair control including a seat support for carrying a seat and a back support for carrying a back with one of said supports rotatably mounted on a torsion bar in turn rotatably carried by a frame member with the other support interconnected with said torsion bar to prevent rotation between said other support and torsion bar, the improvement comprising means on said frame member for engaging one of said supports on rotation of said one support in one direction to thereafter prevent further rotation of said one support in said one direction relative said frame member and for engaging the other support on rotation of said other support in the opposite direction to thereafter prevent further rotation of said other support in said other direction relative said frame member, and means engaged between said one support and a portion of said torsion bar for preventing rotation between said portion and one support to thereby tension said torsion bar in response to either rotation of said one support in said other direction and the engagement of said other support with said frame means or rotation of said other support in said one direction and engagement of said one support with said frame means.

2. In the chair control claimed in claim 1, means on said frame for terminating rotation of said other support in said one direction after said other support has traversed a predetermined arc.

3. A chair control including a seat support for carrying a seat and a back support for carrying a back with said back support rotatably mounted on a torsion bar rotatably carried by a frame member with said seat support interconnected with said torsion bar to prevent rotation between the connected portion of said bar and seat support, the improvement comprising means on said frame member for engaging said back support on rotation of said back support in a forward direction relative said seat support to thereafter prevent further rotation in said forward direction by said back support and for engaing said seat support on rotation of said seat support in a backward direction to thereafter prevent rotation of said seat support in said backward direction, and means engaged between said back support and a portion of said torsion bar for preventing rotation between said portion and said back support to thereby tension said torsion bar in response to either rotation of said back support in said backward direction and the engagement of said seat support with said frame or rotation of said seat support in said forward direction and engagement of said back support with said means on said frame.

4. A chair control including a seat support for carrying a seat and a back support for carrying a back, the improvement comprising a frame member, a torsion bar having opposite ends interconnected with said seat support to prevent relative rotation therebetween and rotatably supported on said frame member, means rotatably supporting said back support on said torsion bar, means engaging said seat support with said frame on rotation of said seat support in one direction to thereafter prevent rotation of said torsion bar relative said frame member, means on said frame member for limiting rotational movement of said back support in a direction opposite said one direction, and means engaged between said back support and a portion of said torsion bar for preventing rotation between said portion and said back support to thereby tension said torsion bar in response to either rotation of said back support in said one direction and the engagement of said seat support with said frame or rotation of said seat support in said opposite direction and engagement of said back support with said means on said frame member.

5. A chair control including a seat support for carrying a seat and a back support for carrying a back, the improvement comprising a frame member, a torsion bar having opposite ends interconnected with said seat support to prevent relative rotation therebetween and rotatably supported on said frame member, means rotatably supporting said back support on said torsion bar, means engaging said seat support with said frame on rotation of said seat support in a backward direction to thereafter prevent rotation of said torsion bar relative said frame member, means on said frame member for limiting rotational movement of said back support in a forward direction, means engaged between said back support and a portion of said torsion far for preventing rotation between said portion and back support to thereby tension said torsion bar in response to either rotation of said back support in a backward direction and the engagement of said seat support with said frame or rotation of said seat support in a forward direction and engagement of said back support with said means on said frame member, and means on said frame member limiting rotation of said seat support in said forward direction after said seat support rotates through a predetermined arc against the tension developed in said torsion bar.

6. A chair control including a seat support for carrying a seat and a back support for carrying a back, the improvement comprising a frame member having end legs adjacent said seat support and overlapped by said seat support, a torsion bar having opposite ends interconnected with said seat support to prevent relative rotation therebetween, means rotatably supporting said torsion bar in said end legs, means rotatably supporting said back support on said torsion bar intermediate said end legs, said seat support engaging said end legs on rotation of said seat support in one direction to thereafter prevent rotation of said torsion bar relative said frame member, stop means on said frame member for limiting rotational

movement of said back support in a direction opposite said one direction, means engaged between said back support and a portion of said torsion bar intermediate said end legs for preventing rotation between said portion and back support to thereby tension said torsion bar in response to either rotation of said back support in said one direction and the engagement of said seat support with said overlapped end legs or rotation of said seat support in said opposite direction and engagement of said back support with said stop means.

References Cited

UNITED STATES PATENTS

2,760,553	8/1956	Lie	297—303
3,136,580	6/1964	Parrott	297—304
3,224,807	12/1965	Welch et al.	297—304
3,240,528	3/1966	Ciuffini et al.	297—303
3,250,567	5/1966	Parrott	297—304

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