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Albinson

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[54] **CHAIR BACK HEIGHT ADJUSTMENT MECHANISM**

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[52] **U.S. Cl.** **297/353**

[51] **Int. Cl.²** **A47C 7/40**

[58] **Field of Search** 297/345, 347, 348, 353, 297/421, 307, 343; 248/161, 405, 422, 424

[56] **References Cited**

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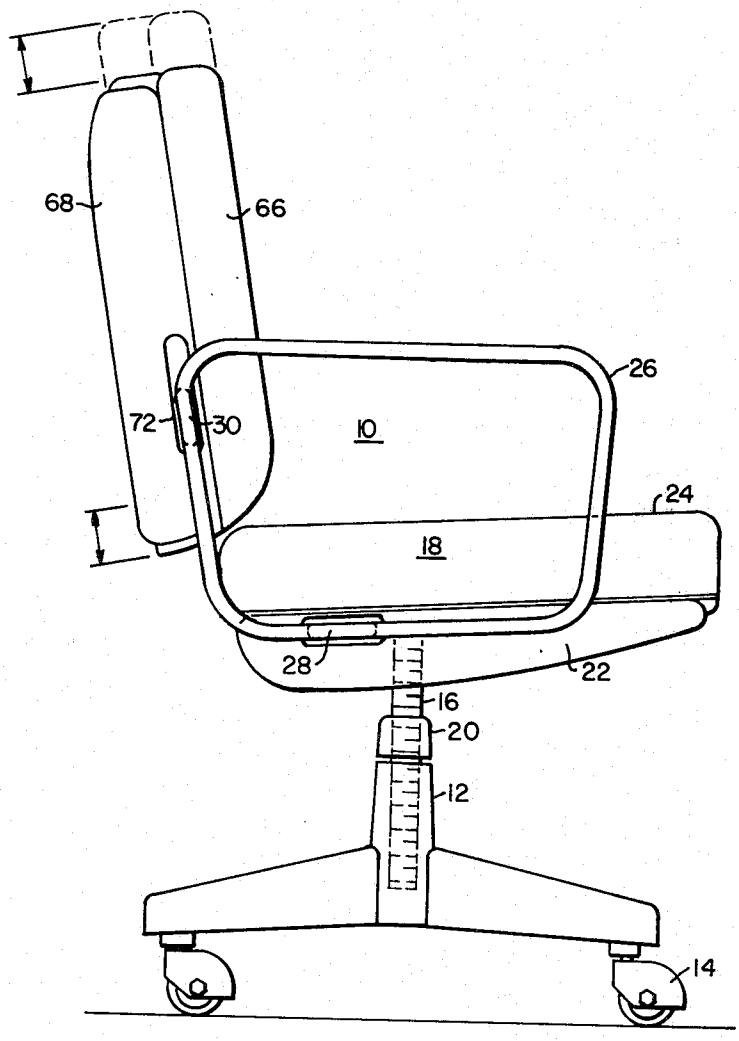
[57] **ABSTRACT**

An improved chair back mechanism for adjusting the height of a chair back which includes a pair of facing C-shaped brackets one of which is connected to the chair back and the other of which is connected to the chair back support. A partially threaded stud extends through aligned apertures in each of the horizontal legs of the C-shaped brackets and upon rotation of the stud one bracket will move vertically with respect to the other effecting an adjustment of the height of the chair back with respect to the chair back support and the remainder of the chair.

1 Claim, 4 Drawing Figures



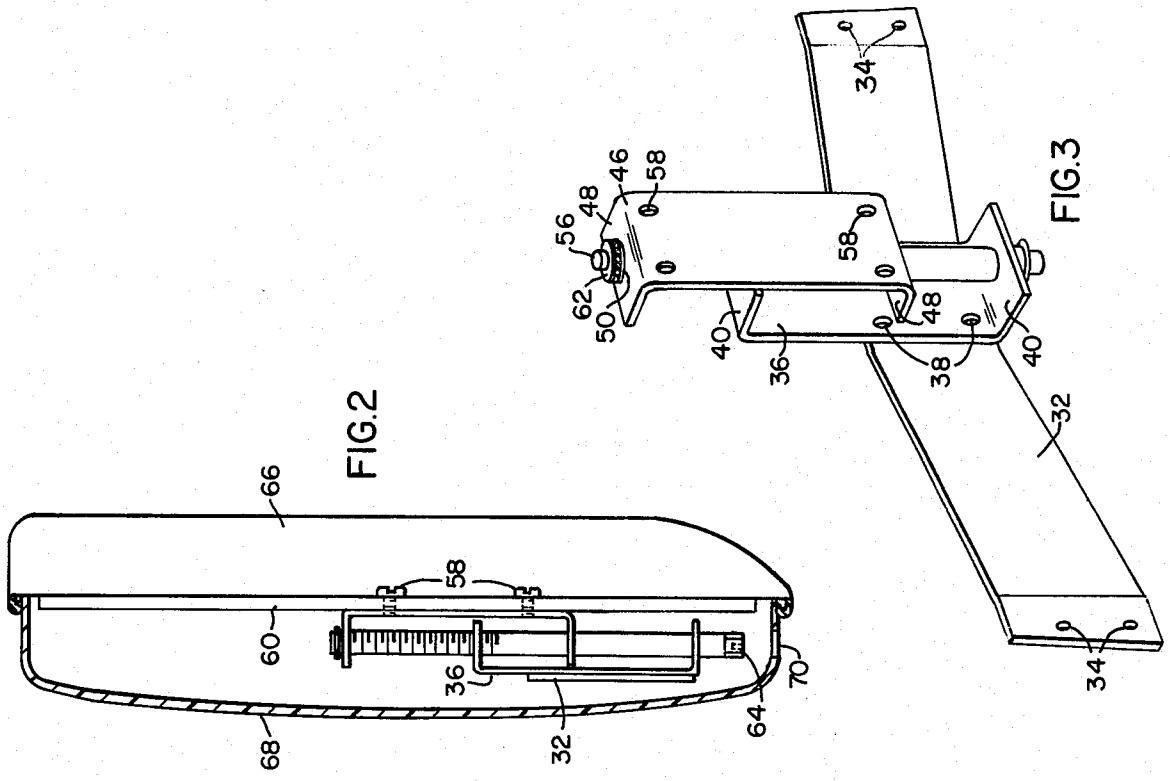


FIG.3

FIG.2

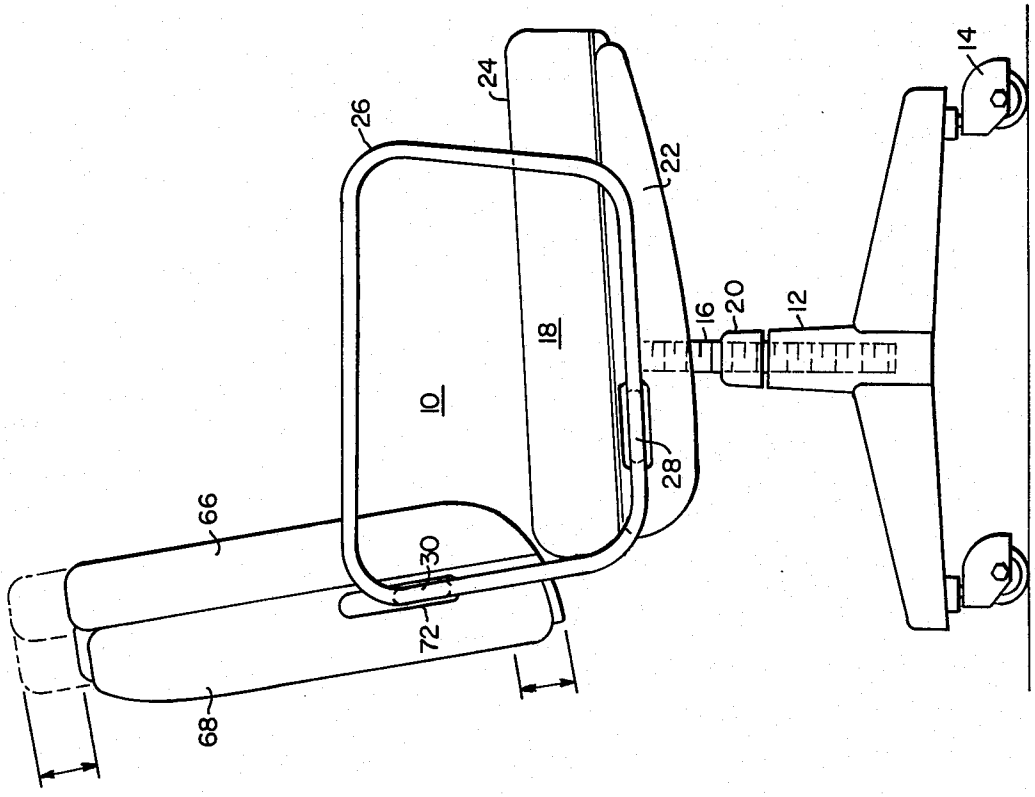


FIG.1

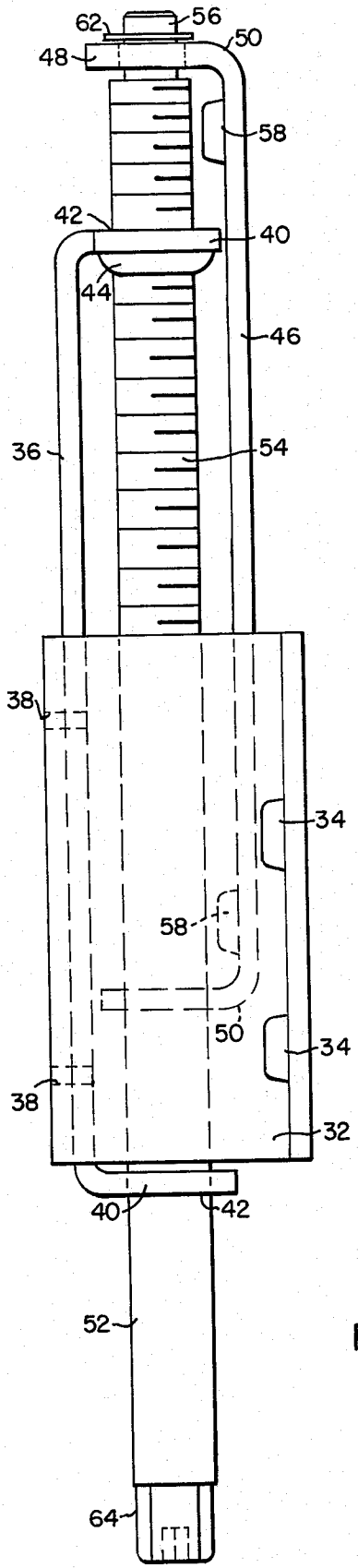


FIG.4

CHAIR BACK HEIGHT ADJUSTMENT MECHANISM

BACKGROUND OF THE INVENTION

One must only encounter a large gathering of people to become readily aware of the fact that the size and shape of the individuals who make up our population differ widely. It will also be apparent to one who is knowledgeable with respect to the modern business office that many people spend the majority of their working day in their office chair. Although it is clearly impossible in the mass production of office furniture to manufacture chairs to the human specifications of each individual who will use a chair it is desirable that a mass produced chair be adjustable in several different ways to not only fit the user but to make the office worker as comfortable as possible. One important chair adjustment is the height of the chair back and this invention relates to a novel mechanism for adjusting the height of the chair back with respect to the remainder of the chair.

Although the height of a chair back is usually only adjusted at the time of acquisition by the user and will remain that way until a different person acquires the chair for extended use before it is adjusted again, the adjustability of the chair back still must be provided. A chair back adjustment mechanism, by virtue of the very nature of its mechanical parts, detracts from the aesthetics of the chair and it is preferable that a chair back adjustment mechanism be hidden within the chair body. Additionally, when the adjustment hardware extends from the back of the chair it can significantly scratch and mar adjacent office furnishings unless the chair user is extremely careful. Several prior art chair back adjustment mechanisms have been employed to adjust the height of the chair back and include the bolt and slot with latch lever mechanism disclosed in U.S. Pat. No. 2,168,620 which is visible at the back of the chair but does provide for a infinite number of positions between the highest and lowest adjustment, complex ratchet and latch mechanisms of the type disclosed in U.S. Pat. No. 2,509,102 and slot and projection mechanisms which provide only a fixed number of positions but which may be hidden within the back of the chair for aesthetic purposes as disclosed in U.S. Pat. No. 3,526,430. The majority of these prior art back height adjustment mechanisms either suffer from complexity, are required to be visually exposed for access or do not provide for an infinite number of intermediate height positions between the highest and lowest positions for the chair back.

SUMMARY OF THE INVENTION

The chair back height adjustment mechanism of this invention obviates the composite prior art defficiencies by providing a simple mechanical adjustment mechanism which can be completely enclosed within the back of the chair, provides for an infinite number of positions between the highest and lowest height adjustments and employs a simple positive mechanical action not subject to failure through repetitive usage. The foregoing is accomplished in accordance with the present invention by providing in a chair including a base portion, a seat portion, a pair of back mounting arms extending from the base portion and a chair back including a structural chair back member enclosed within

the chair back, the improved chair back height adjustment mechanism of this invention. This chair back height adjustment mechanism includes a back support member extending between the back mounting arms, a first C-shaped bracket secured to the back support member and having a pair of vertically aligned apertures in each of its horizontally extending arms, a second C-shaped bracket secured to the structural chair back member and facing in an opposed relationship to the first C-shaped bracket which also includes a pair of vertically aligned apertures in each of its horizontally extending arms, and an at least partially threaded stud which extends through the vertically aligned apertures in both of the C-shaped brackets. At least one of the apertures in one of the brackets includes threads which are constructed and arranged to coact with the threads on the stud to provide relative linear movement between the one C-shaped bracket and stud in response to rotation of the stud with at least one of the apertures in the other C-shaped bracket being secured to the stud for linear movement therewith while permitting rotation of the stud with respect thereto. The chair back shell completely encloses the structural chair back member and the back support member is connected to the back mounting arms through openings in the sides of the chair back shell while an aperture in one of the top and bottom edges of the chair back shell provides access to tool receiving means on the stud.

BRIEF DESCRIPTION OF THE DRAWINGS

Many of the attendant advantages of the present invention will become more readily apparent and better understood as the following detailed description is considered in connection with the accompanying drawings in which:

FIG. **1** is a side elevational view of a typical chair which may employ the chair back height adjustment mechanism of this invention;

FIG. **2** is a side elevation view partly in section illustrating the back height adjustment mechanism of this invention;

FIG. **3** is an isometric view of the back height adjustment mechanism connected to the back support bar; and

FIG. **4** is a full size side elevation view of the back height adjustment mechanism of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings wherein like reference characters represent like parts throughout the several views there is illustrated in FIG. **1** a chair representative of typical office seating generally designated **10.** The chair **10** includes a base **12** typically supported on a plurality of casters **14** and having a threaded shaft **16** connected to a tilt mechanism (not shown) hidden within the seat **18.** An adjusting collar **20** is typically employed between the base **12** and the seat **18** to adjust the height of the seat with respect to the floor. The seat of a standard office chair will generally include a structural support member (not shown) hidden within a molded plastic bottom cover **22** and carrying a cushion and cushion cover **24.** In a typical chair, arms are provided at **26** which are conventionally fixed to the structural seat member with the chair back being typically supported by a vertical member extending from the chair tilt mechanism proximate the

middle of the back of the seat upwardly to support the back. In the chair illustrated in FIG. 1 the structural relationship of the tilt mechanism arms and back are constructed in accordance with the teachings of application Ser. No. 473,965 for Improved Chair Structure and Tilt Mechanism Therefor, filed the same day as this application by the same inventor and owned by the same assignee as this application. In this regard, the arms **26** are connected directly at **28** to laterally projecting arms extending from the tilt mechanism and the back is supported directly from the arms at **30** through the chair back support member **32** which extends across the back of the chair and is connected to small arm projections by being bolted thereto or similarly at **34** providing a unique construction wherein the arms tilt in conjunction with the chair back in a manner described in detail in said copending application as opposed to the typical office chair construction wherein the back alone tilts with respect to the arms which are either stationary or move only in conjunction with a seat tilt of lesser degree.

The chair back height adjustment mechanism of this invention is supported midway along the back support member **32.** In this regard, a first C-shaped member or bracket **36** is bolted, welded or riveted as at **38** to the back support member **32.** The C-shaped member **36** has in its horizontally extending arms **40** a pair of aligned apertures **42** one of which has a raised internally threaded portion **44.** A second C-shaped member or bracket **46** having a pair of horizontally extending arms **48** with apertures **50** therethrough is arranged so that the apertures **50** and the apertures **42** are aligned. A partially threaded stud **52** having a threaded portion **54** and a reduced diameter portion **56** extends through the apertures **42** and **50.** The second C-shaped member **46** is fixed by bolts, welding or rivets at **58** to the rigid chair back structural member **60.** The reduced diameter portion **56** of the partially threaded stud **52** extends through the upper aperture **50** of the C-shaped member **46** and an E clip retaining ring **62** or similar radius expanding device is employed to retain the upper horizontal arm **48** of the C-shaped member **46** fixed with respect to the stud **52** at the upper end thereof.

The bottom end of the partially threaded stud **52** includes tool receiving means **64** which may be in the form of a hexagonal end or a screwdriver slot or any similar configuration that can provide for rotation of the stud from the lower end.

The rigid chair back structural member **60** includes on its front side a foam cushion covered by an upholstered fabric **66** and mounted to the back portion of the rigid chair back structural member **60** is a molded plastic shell **68** which completely encloses the chair back height adjustment mechanism but provides access at **70,** preferably in the form of a circular aperture, to the bottom end of the stud and hence the tool receiving means **64.** Lateral openings **72** are also provided in the side walls of the molded plastic chair back shell **68** through which the arms **26** are connected to the back support member **32** as indicated at **30** in FIG. **1.**

In operation, the first C-shaped member **36** is fixed to the back support member **32** and receives in its upper threaded aperture **42** the threaded stud **52.** The other C-shaped member **46** is secured through its upper horizontal arm **48** to the threaded stud **52** for vertical movement therewith while permitting rotation of the stud with respect thereto. Through the fixed mounting at **58** of the C-shaped member **46** to the rigid chair back structural member **60,** the stud, C-shaped member **46** and chair back structural member will move in unison and be caused to move vertically either upwardly or downwardly in response to coaction between the threads **54** and the threaded apertures **42, 44** when the stud is rotated.

It will be apparent that when a tool is inserted through the aperture **70** in the molded chair back **68** it acts upon the tool receiving means **64** to rotate the stud **52.** Rotation of the stud **52** will cause the chair back to be adjusted either upwardly or downwardly depending on the direction of rotation of the stud **52** to any position defined by the length of the threaded portion **54** of the stud **52.** Preferably, this distance for a typical office chair would provide for an adjustment of about 2½ inches and such adjustment range should be satisfactory to accommodate any of the various chair users.

It will also be apparent that within the concept of this invention the entire back height adjustment mechanism may be inverted with access to the tool receiving means **64** then being had through the top side of the molded chair back. Also, a mere reversal of parts would permit the stud **52** to remain stationary with respect the C-shaped bracket **36** through a fixed connection at one of the apertures **42** if the threaded aperture was then provided at one of the apertures **50.** Such construction would, of course, mean that only the C-shaped bracket **46** and the chair back structural member **60** would move in response to rotation of the stud **52.**

As will be apparent from the foregoing the chair back height adjustment mechanism of this invention is completely hidden within the confines of the chair back, provides an infinite number of positions between the confines of its upper and lower limits and is mechanically simple and easily accessible while not detracting from the aesthetics of the chair itself.

What is claimed is:

1. A chair comprising, in combination:

a base portion,

a seat portion mounted on said base portion,

a pair of back mounting arms extending from said base portion on either side of said seat portion,

a chair back including a structural chair back member completely enclosed within said chair back,

a back support member extending through openings in the sides of said chair back and connected between said back mounting arms,

a first C-shaped bracket secured to said back support member having a pair of vertically aligned apertures, one in each of the horizontally extending arms thereof,

a second C-shaped bracket secured to the structural chair back member and facing in an opposed relationship to said first C-shaped bracket, said second C-shaped bracket also including a pair of vertically aligned apertures, one in each of the horizontally extending arms thereof, and

an at least partially threaded stud including at one end thereof tool receiving means whereby rotation may be imparted to said stud, said stud extending through each of said vertically aligned apertures in both said first and said second C-shaped brackets, at least one of said apertures in one of said C-shaped brackets including threads therein constructed and arranged to coact with the threads on said stud to provide a relative linear movement be-

tween said one C-shaped bracket and said stud in response to rotation of said stud, at least one of said apertures in the other of said C-shaped brackets being loosely secured to said stud for linear movement therewith while permitting rotation of said stud with respect thereto, said first and second C-shaped brackets and said partially threaded stud being completely enclosed within said chair back and said chair back including an aperture in the bottom edge thereof to provide access to said tool receiving means on said stud.

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