United States Patent [19]

Bogart

[11] **3,848,845**

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[54] **ADJUSTABLE SEAT ASSEMBLY**

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[73] Assignee: **Arthur J. Klein,** Cleveland, Ohio ; a part interest

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[21] Appl. No.: **241,991**

[52] **U.S. Cl.**..... **248/393,** 297/330, 297/DIG. 10

[51] **Int. Cl.**.. **F16m 11/24,** F16m 13/00, B60n 1/02

[58] **Field of Search**..... 297/313, 330, DIG. 10; 248/377, 393–397

[56] **References Cited**

UNITED STATES PATENTS

3,091,426	5/1963	Bogart	248/393
3,250,569	5/1966	Gaffney	297/330
3,692,271	9/1972	Homier et al.	248/394

Primary Examiner—Casmir A. Nunberg

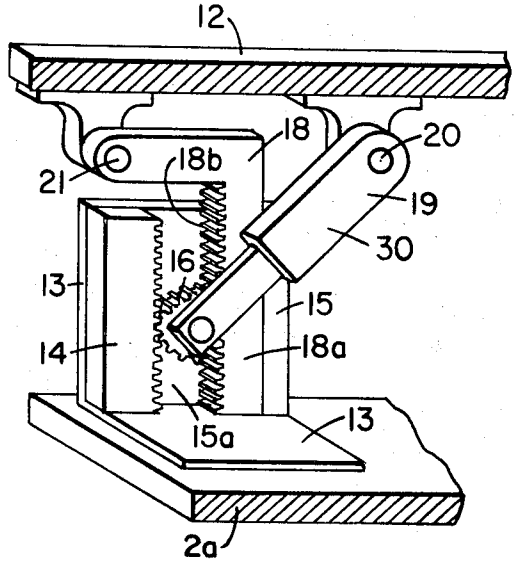
Attorney, Agent, or Firm—Baldwin, Egan, Walling & Fetzer

[57] **ABSTRACT**

An adjustable seat for use in combination with a chair or like support whereby individuals with limited muscular control such as persons afflicted with arthritis or aged persons may be assisted without exertion on their part in moving from a sitting position to a standing position, and vice versa. The seat may be an integral part of the chair or a separate assembly which is placed thereon, and includes a body supporting part that is controllably automatically actuatable by the person tiltably, upwardly and forwardly toward the front of the chair in the direction the person normally moves in rising from a sitting position within the chair to a standing position.

Conversely, the body supporting part may be controllably actuated by the person in the opposite direction when the person desires to be seated thereby in the chair.

3 Claims, 7 Drawing Figures



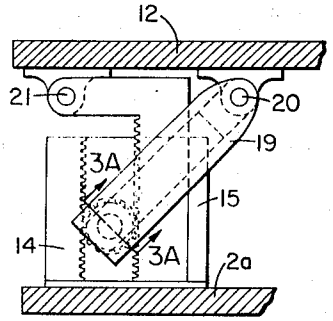


Fig. 3

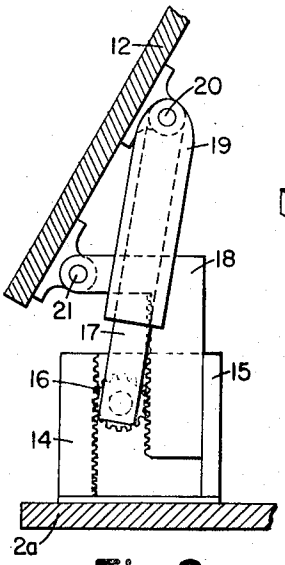


Fig. 2

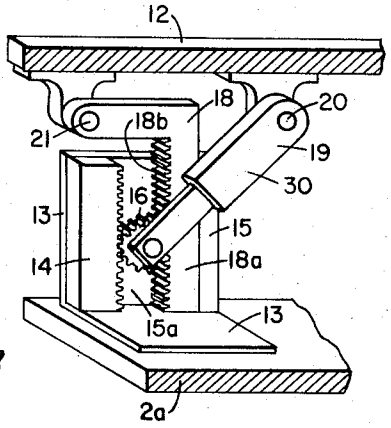


Fig. 1

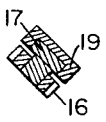


Fig. 3A

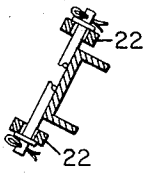


Fig. 4A

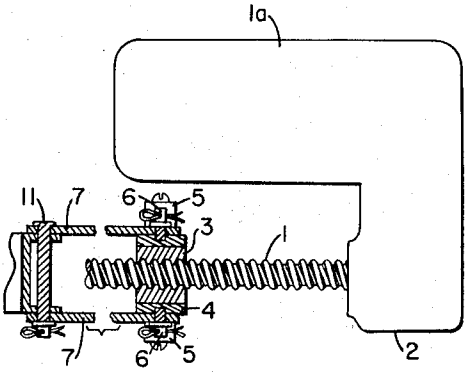


Fig. 5

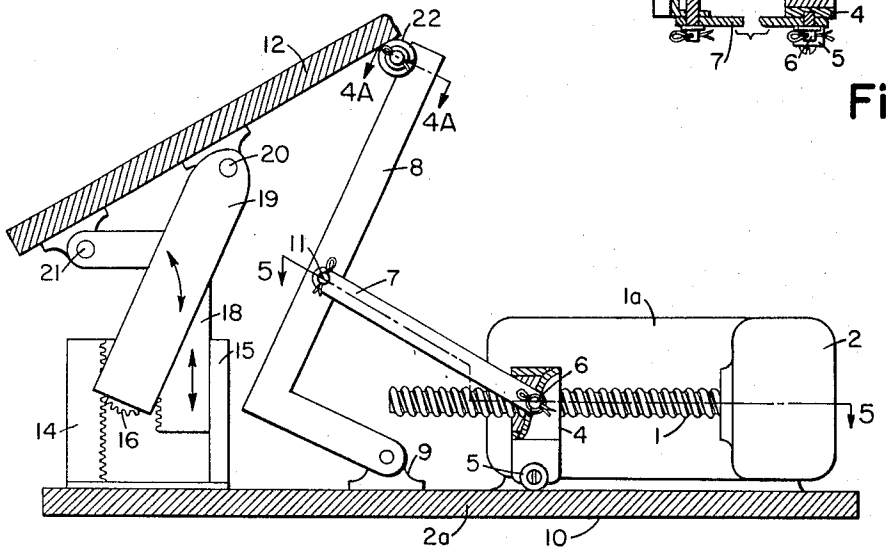


Fig. 4

ADJUSTABLE SEAT ASSEMBLY

This invention relates in general to a new and novel seat assembly for use in combination with a chair or like support especially designed to assist a handicaped person, in rising from a sitting position in a chair to a standing position in front of the chair, and vice versa. The seat assembly, as herein shown, may be a separate structure adapted to be placed within a chair or like support or, if desired, this assembly may be constructed as an integral part of the chair support.

The seat assembly of the present invention is an improvement over the chair structure disclosed in U.S. Pat. No. 3,091,426, the inventor of which is the applicant's parent. Applicant is also aware of U.S. Pat. No. 3,250,569 directed to an elevator seat.

As will be hereinafter more apparent the primary object of the invention is to provide a mechanically operable seat assembly that provides an elevating and tiltable support to an individual who needs an independent powered lift to stand up or be seated.

Another object of the invention is to provide a seat assembly having an elevating lift during and at the same time the seat is being tilted forward, this motion being simultaneous and in proportion that offers comfort and independent support during the spatial displacement of the rising or lowering of the seat.

It is another object of the invention to provide a permanent means of mechanical assistance to those individuals who have lost muscular coordination permanently and would otherwise need the physical assistance of another person to stand up or be seated.

It is also an object of the invention to provide a portable seat, the seat assembly of which is self-contained, and adapted to be supported in a chair or like support, the seat assembly being intended also to fit into portable folding wheelchairs and the like.

These and other objects will be apparent from the following specification and the drawings here in which are defined in the appended claims.

FIG. **1** is a partial isometric view of the seat assembly of the present invention showing in particular the front elevation mechanism;

FIG. **2** is a side view in section showing the seat in an elevated position;

FIG. **3** is a fragmentary view illustrating the seat in a horizontal position at rest, and the gear and slide bar relationship in said position;

FIG. **3A** is a view looking in the direction of the arrows **3A—3A** in FIG. **3**;

FIG. **4** is a general layout of the entire seat assembly with the body supporting seat at an intermediate elevation;

FIG. **4A** is a view looking in the direction of the arrows **4A—4A** in FIG. **4**; and

FIG. **5** is a plan view at an elevation along line **5—5** of FIG. **4**.

The tilting elevatable seat assembly of the present invention is indicated generally by the reference **10**, FIG. **4**, and is illustrated herein as a seat assembly that rises as it tilts by means of a motor driven screw **1**, FIG. **5**, extending from a gear box **2** acting as the output of the motor power source. The motor **1a** and associated gear box **2** may be supported on any suitable base as shown at **2a**. As seen in FIG. **5**, a non-rotating nut **3** is locked in place on the screw **1** by a knurled press fit, thereby directly contacting the screw **1**. This nut is housed in a travelling block **4**, FIG. **5**, having rollers **5** suitably attached to the bottom thereof. Pins **6** extending outwardly from the sides of block **4** support one end movable link **7** thereon. As the screw turns in either direction, being controlled by any suitable switching mechanism (not shown), the block **4**, nut **3**, and movable link **7** traverse forward and backward along the screw **1**, said link rolling along the base **2*a*** on the rollers **5**. The opposite end of link **7** is pivotally connected by pin **11** to an L-shaped lifter arm **8**, FIG. **4**, intermediate its ends. One end of said arm **8** is swingably connected to a bearing mount **9**, carried on base **2*a***, the opposite end of said arm mounting rollers **22** adapted to roll along the undersurface of seat **12**.

In a manner hereinafter more clearly understood, when motor **1*a*** and its gear drive **2** are actuated to rotate screw **1** to move link **7** to the left as seen in FIG. **4**, the lifter arm **8** is swung counterclockwise about bearing mount **9** whereby the seat **12** is, in turn, tiltably swung upwardly and in a counterclockwise direction. The rollers **22** rollably move along the undersurface of seat **12** during the movement to the right as viewed in FIG. **4**.

The extent of tilting motion given to seat **12** may be controlled by a suitable conventional electrical control adapted to selectively reversably energize the motor **1a** to affect the rotation of the screw **1**.

A seat lifting or elevating mechanism is also incorporated into the seat assembly for elevating said seat **12** at the same time it is tiltably moved, and for this purpose a pair of elevating mechanisms are utilized (left and right hand respectively) as identified in their entirety in FIG. **1** by the reference numeral **30**.

The elevating mechanisms **30** are interconnectable between the base **2*a*** and the seat **12** and may be spaced apart at any desired distance, and although they operate simultaneously by the same power source, they are independent of each other as to mechanical connection. As seen particularly in FIG. **1**, each mechanism includes an L-shaped plate **13** mounted in an upright position on the top surface of base **2*a***. An elongated gear rack **14** is mounted on the plate **13** extending upwardly therefrom. A bar **15** is likewise fastened in an upright position on plate **13** in spaced relation to rack **14** defining spaceway **15*a*** therebetween.

An L-shaped riser bar **18** is disposed in said spaceway **15*a***, its upright arm **18*a*** being slidably disposed adjacent the wall of bar **15** and has a linear gear train **18*b*** formed thereon. The remaining arm **18*c*** of said bar **18** has its free end pivotally attached to the underside of the seat **12** adjacent the front edge of said seat by means of pin **21**.

A bar **17** is telescopically carried within arm **19**, the latter being preferably formed in section to slidably retain said bar **17** within the same. As seen in FIG. **1**, the upper end of arm **19** is pivotally anchored by pin **20** to the underside of the seat **12** rearwardly of the pin **21**.

A spur gear **16** is rigidly attached to one end of the bar **17** and is disposed to be in meshing engagement with the rack **14** and the gear train **18*b*** on bar **18**.

The seat tilting assembly previously described is operable to cause the seat **12** to reversibly swing or tilt on pin axes **21** as best seen in FIG. **2** between a raised or elevated position and a lowered position, as seen in FIG. **1**.

As the motor **1*a*** and associated screw drive **1** actuate to swing the seat **12** counterclockwise about pin **21** by way of the connecting lever **7** and bar **8**, the arm **19** is

also pivoted counterclockwise about the axes of gear **16** thus giving rotational leverage to slide bar **17,** the latter telescoping therein.

With the gear rack **14** being stationary the support bar **18** is free to climb upwardly on rack **14** from its FIG. **1** position toward its FIG. **2** position. With the gear **16** rigidly attached to the end of bar **17,** said gear climbs the rack **14** to result in simultaneously forcing the riser bar **18** to likewise slidably move vertically upwardly toward the FIG. **2** position.

As a result, the seat is raised upwardly from its FIG. **1** to its FIG. **2** position while simultaneously tilted counterclockwise about pin mounting **21** thereby to result in a combination elevating and tilting movement being given to said seat **12** which is highly successful in assisting a person seated thereon to be raised to a standing position in front of the seat.

Conversely, with the seat **12** in its FIG. **2** position, a person may lean slightly upon said seat while energizing motor *a* to swing said seat toward its FIG. **1** or lowered position whereby the aforesaid combination movement of said seat reversibly lowering and swinging to its said FIG. **1** position is effective to comfortably assist the person in moving to a seated position on said seat **12.**

In tilting the seat **12** from a horizontal position, FIG. **3,** to a full vertical 90°position the gear **16** actually only rotates 90°. In doing so the linear rise of the bar **17** is 180° of the circumference of said gear **16.** This is accomplished by the fact that the fulcrum point of the gear **16,** FIG. **2,** is at the point of contact with the stationary gear rack **14,** FIG. **2,** and not the center of the gear. A duality of motion takes place. The gear actually moves upward forcing, by direct contact, the movable riser bar **18** to move up in the same direction at the same time converting 180°of the gears circumference to a vertically linear displacement of this dimension.

Adjustments may be attained in the assembly by inserting the gear **16** into the mechanism at various positions on the rack **14.** This selection makes the seat **12** higher or lower in its initial horizontal position. The selective size of the gear used also gives unlimited adjustments as to the amount of lift required.

As before mentioned, the seat assembly herein may be constructed as a separate unit, or it may be made as an integral part of a conventional chair unit taking its position therein in place of the usual seat therefor.

Having thus described a preferred embodiment of seat assembly, it will be realized that the same is susceptible to various modifications and adjustments of parts without departing from the inventive concepts thereof as are defined in the claims.

What is claimed is:

1. An adjustable seat assembly comprising a base, a seat member disposed above said base, drive means for swinging and elevating said seat relative to said base, bar means connectable with said base being movable in direction generally perpendicular to said base, means pivotally connecting said bar means to said seat, lever means comprising a first lever and a second lever operatively connected to each other in telescopic relation, the first lever being operatively connected to the bar means and the second lever being operatively connected to said seat, said drive means being operatively connected to said seat and actuable to swing said seat about said bar means pivotal connection, and said lever means being movable with said seat and operable to move said bar means relative to said base effective with said drive means to simultaneously swing and elevate said seat.

2. An adjustable seat assembly as defined in claim **1** and wherein the bar means is provided with a gear rack and the first lever has gear means for meshing engagement with said rack whereby movement of said lever means causes the bar means to move relative to the base.

3. An adjustable seat assembly as defined in claim **1** and wherein swinging of the seat by said drive means causes said first lever to move telescopically relative to said second lever affecting the movement of said bar means to simultaneously swing and elevate said seat.

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