June 29, 1965 K. H. BAGNELL 3,191,594

THERAPEUTIC CHAIR

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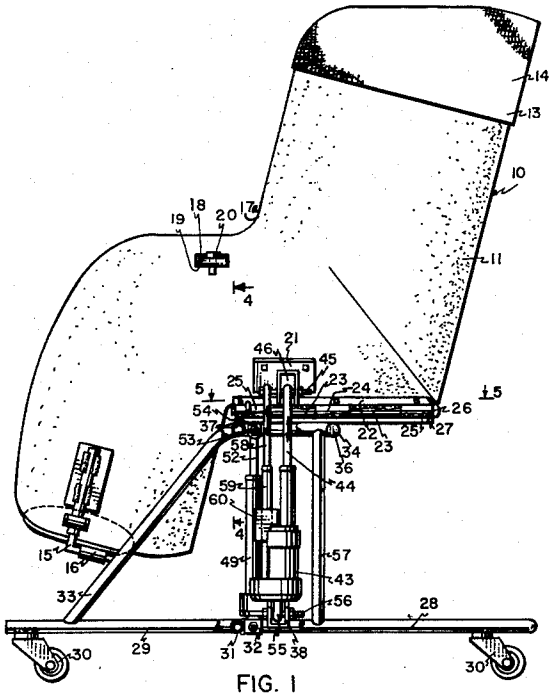


FIG. 1

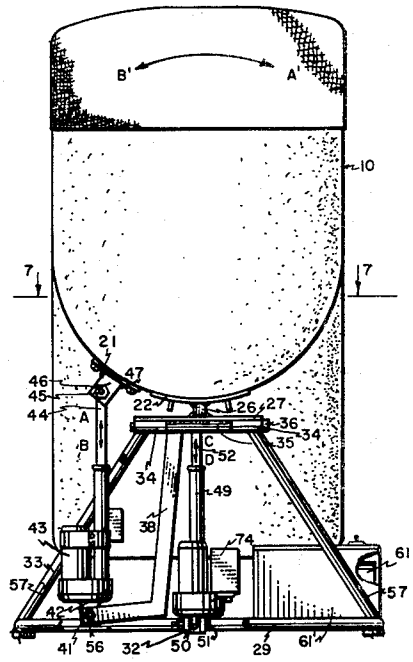


FIG. 2

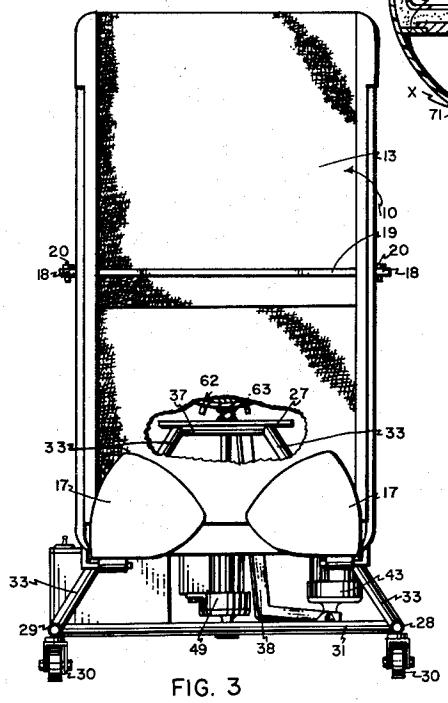


FIG. 3

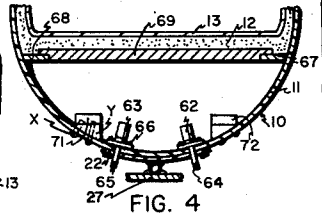


FIG. 4

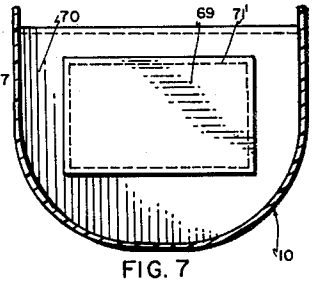


FIG. 7

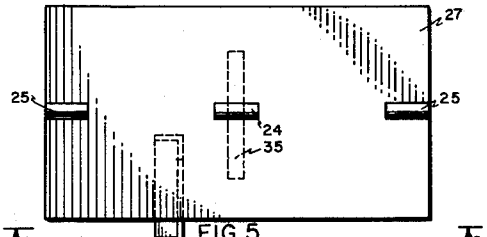


FIG. 5

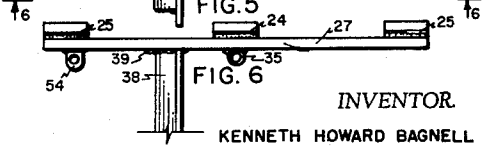


FIG. 6

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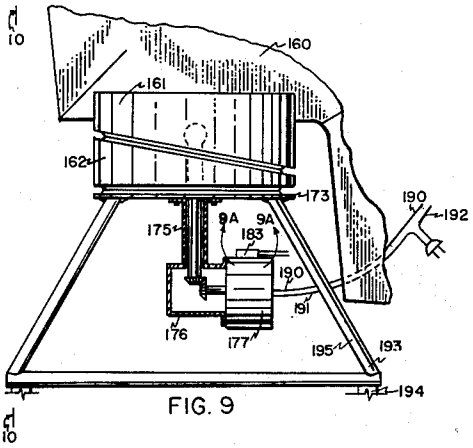


FIG. 9

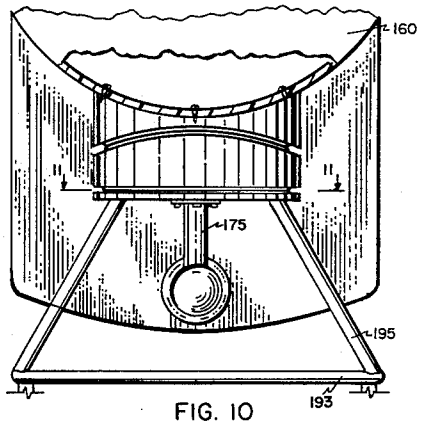


FIG. 10

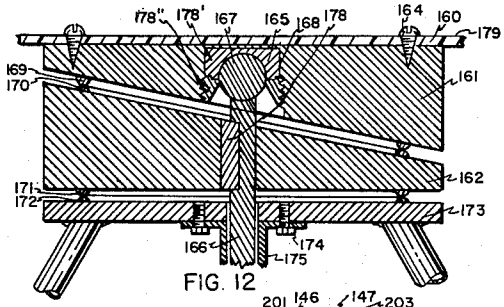


FIG. 12

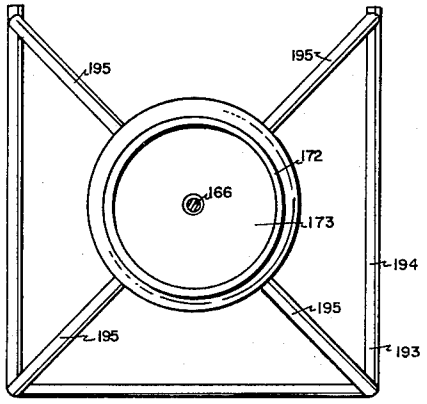


FIG. II

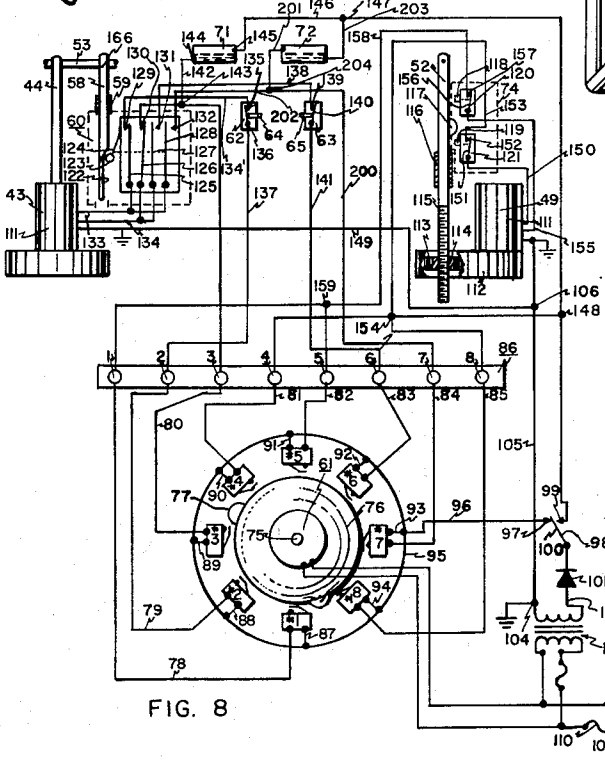


FIG. 8

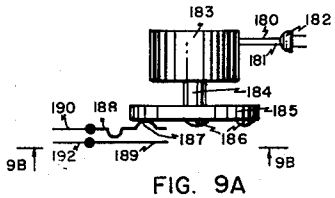


FIG. 9A

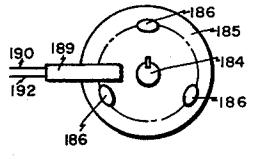


FIG. 9B

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United States Patent Office 3,191,594 Patented June 29, 1965

3,191,594

THERAPEUTIC CHAIR

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Filed Jan. 10, 1963, Ser. No. 250,683
3 Claims. (Cl. 128—24)

The present invention relates to therapeutic chairs for hospitals, rest homes and convalescent patients in general and, more particularly, to a new and improved therapeutic chair and electrical system therefor which, in the operating cycle thereof, tilts both sideways and rearwardly in a selected operating sequence so that certain physiological advantages may be obtained.

This invention is concerned with the providing of a therapeutic chair which tilts slightly, and slowly, in several directions, sequentially, and at given times, so that maladies such as blood clots, hyperstatic pneumonia, and reduced blood circulation will be avoided for patients.

Accordingly, a principal object of the present invention is to provide a new and improved therapeutic chair which in its operating sequence tilts from side to side, rearwardly and forwardly, back to normal position, for the comfort and help of patients sitting therein; the motion of the chair is designed to be slow and yet sufficiently pronounced so that the deleterious effects of reduced circulation, chances of blood clotting, hyperstatic pneumonia, and so forth can be avoided.

A further object of the invention is to provide in a convalescent chair a universal joint mount, with appropriate means being provided to selectively tilt the chair rearwardly and again to upright position, and to both sides also, during a particular cycle of operation.

A further object of the invention is to provide in the electrical system of the present therapeutic chair an alternate, attendant circuit which, when actuated, will return the chair to upright position regardless of what point in the operating cycle the chair is in.

A further object of the invention is to provide a simplified electrical means for sequentially tilting progressively a therapeutic chair, this by the inter-cooperation of wedge-shaped support members beneath the chair, one of which rotates and the other of which remains stationary, these members being intercooperating bearing members.

A further object of the invention is to provide appropriate limit switch means and sensing switch means in the therapeutic chair which perform desired safety limit and return functions, as hereinafter pointed out.

A further object of the invention is to provide a tilting therapeutic chair which can be driven by a minimum number of motor means, this in combination with timing sequence means of conventional design.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which:

FIGURE 1 is a side elevation of a therapeutic chair according to one form of the invention.

FIGURE 2 is a rear elevation of the chair shown in FIGURE 1.

FIGURE 3 is a front elevation of a chair illustrated in FIGURES 1 and 2.

FIGURE 4 is a view, principally in section, taken along the line 4—4 in FIGURE 1.

FIGURE 5 is a plan, taken along the line 5—5 in FIGURE 1, of the support plate used in the invention.

FIGURE 6 is a side elevation taken along the line 6—6 in FIGURE 5.

FIGURE 7 is a view partially in section, looking down, and taken along the line 7—7 in FIGURE 2.

FIGURE 8 is a schematic diagram of an electrical circuit which is used in practicing the present invention according to the embodiment illustrated in FIGURES 1–7.

FIGURE 9 is a fragmentary left side elevation of a therapeutic chair according to a second form of the invention.

FIGURE 9A is an enlarged schematic detail taken along the line 9A—9A in FIGURE 9.

FIGURE 9B is a further detail of the sequence control for the embodiment illustrated in FIGURES 9–12.

FIGURES 10 is a rear view of the structure of FIGURE 9 and is taken along the line 10—10.

FIGURE 11 is a plan taken along the line 11—11 in FIGURE 10, illustrating the support structure of the invention.

FIGURE 12 is a longitudinal vertical section, shown in enlarged scale, of a central portion of the structure illustrated in FIGURE 9.

In FIGURES 1–4 the therapeutic chair 10 of the present invention is shown to include a chair member 11 which is provided with a foam rubber liner 12 and a cover 13. Cover 13 is preferably supplied a pocket portion 14 to slip over the top of chair member 11 as shown in FIGURE 1. Arms 15 and hinges 16, anchored to the chair member 11 by conventional means, are provided with foot rests 17 which may be swung outwardly and downwardly to support the feet of a patient sitting in the chair. The respective sides of chair member 11 may be provided with apertures 17*a* which receive the ends 18 of crossbar 19, the same being pinned at opposite extremities by retainer pins 20 so as to preclude the crossbar from slipping out of its retention with the chair member 11. Crossbar 19 serves the purpose of a safety device which keeps the patient from inadvertently falling out of the chair.

Chair member 11 is preferably made of plastic or fiber glass, merely by way of example. Other materials are possible for use, of course. Unless chair member 11 is formed of metal mounting plates 21 and 22 will be secured to the chair member 11 by conventional attachments. To mounting plate 22 is welded or otherwise affixed tubular chair pivot members 23. Corresponding tubular members comprise plate pivot members 24 and 25, and the members 24 and 25 are welded to pivotal support plate 27 and are disposed in line with members 24 and 25 to receive pivot pin 26.

Frame 28 comprises a U-shaped member 29 provided with the usual four casters 30, is open at the front, and has the "base" of the U toward the rear. A transverse central brace 31 is welded or otherwise affixed to the U-shaped frame member 29, and to the latter at a medial area thereof is welded a U-bracket 32. This portion of the structure will be considered at a later point. Support braces 33 are welded to frame 28 at U-shaped member 29 and proceed upwardly and rearwardly as indicated in FIGURE 1. The rear extremities of the support braces 33 are welded to respective, back crossbar, both denoted 34, which are aligned and spaced apart to receive a back crossbar central member 35 that is welded to support plate 27. The members 34 and 35 receive a pivot pin 36. Front crossbar member 37 is welded to upstanding support braces 33 as shown in FIGURE 3. The support plate 27 is adapted to rest at its forward margin against and over the front crossbar 37 when it is in its extreme forward position (which, preferably, is the upright position). Mounting brace 38 is welded at 39 to support plate 27, see FIGURE 6, and is configured outwardly as shown in FIGURE 2 to provide a bifurcated mounting portion 41 for receiving mounting ear 42 of actuator 43. Extension member 44 of actuator 43 is pinned at 45 to bifurcated bracket 46 which is welded at 47 to mounting plate 21.

See FIGURES 1 and 2. A pin 56 pivotally anchors ear 42 to bifurcated portion 41 of member 38, as shown in FIGURE 2.

In a similar manner, actuator 49 includes an eyemounting portion 50 which is pinned at 51 to U-shaped mounting bracket 32, the latter being welded as previously mentioned to central brace 31. Extension arm 52 is suitably apertured and is provided with a pivot pin 53 for pinning the same to U-shaped bracket 54. The latter is welded or otherwise affixed to plate 27 of the frame as shown in FIGURE 6.

For added support, support legs 57 may be supplied at both sides of the structure. Pivot member 45 also pivotally journals arm 58, reciprocates within sleeve 59 of switch mechanism 60. Switch mechanism 60 will be more fully described hereinafter; at the present point of discussion it will be understood to be integral, or affixed, to actuator 43 and the mounting means thereof.

Synchronous motor 61 of electrical unit 61' is specifically shown in FIGURE 2, and is mounted to the frame 28 in a conventional manner. The electrical circuit associated with synchronous motor 61 will be understood to be contained within unit 61' shown. Limit switches 62 and 63 include spring-loaded fingers 64 and 65. These switches are mounted by attachments 66 to the chair member 11 in a conventional manner.

Chair member 11, as shown in FIGURE 4 includes seat shoulders 67 and 68 which support seat 69, FIGURE 7. The shoulders 68 and 67, FIGURE 4, may be integral parts of a horizontal member 70 which seats the seat member 69 at its lapped margins 71'. Mercury switches 71 and 72 are normally-open switches and are mounted by bolts X, shims Y to the underside of chair member 11 as indicated in FIGURE 4. Limit switch mechanism 74 is securely mounted to actuator 49 as shown in FIGURE 2.

The electrical circuit shown in schematic form in FIGURE 8 applies to one form of the present invention, FIGURES 1–7, and will now be considered. Motor 61 includes a shaft 75 to which discs 76 is keyed. Disc 76 includes a peripheral cam 77 which sequentially engages and thereby closes the normally open microswitches #1–#8. The several microswitches #1 through #8 are positioned as shown about the periphery of disc 76, are normally open, and are sequentially closed, as before mentioned, by cam 77 as it revolves. The motor 61 is a synchronous motor, may self-contain a gear reduction means, and has a final output of one revolution per two hours, merely by way of example. Leads 78–85 are respectively connected between one side of each of the microswitches #1–#8 to corresponding terminals Nos. 1–8 of terminal bus 86. Remaining leads 87–94 are connected to the remaining sides of microswitches #1–8 and also to ring conductor 95, and the latter is directly connected by lead 96 to terminal 97 of control switch 98. Control switch 98 includes another terminal 99 and a pivot contact arm 100, and the latter is connected by rectifier 101 to one side of the output winding and 102 of transformer 103 is maintained at ground potential, as shown, and is connected by lead 105 to junction 106. Input plug 107 is adapted for coupling to an alternating current power source, and leads 108 and 109 thereof are directly connected to motor 61, serving as input leads. One of the lines 108 and 109 includes a fuse 110 as shown.

Actuator 49 includes a motor 111, a gear box 112 coupled to the output shaft thereof. Gear box 112 includes a final output gear 113 which is appropriately journaled and which includes an interior threaded or toothed bore 114 which cooperates with the threads or teeth 115 of extension arm 52. Thus, rotation of output gear 113 in one direction will produce a raising of extension arm 52, whereas an opposite revolvement of output gear 113 will produce a retraction or lowering of extension arm 52. Sleeve 116 encases extension arm 52 and permits the slidable movement therewithin of the same.

Extension arm 52 includes a cam 117 which travels between and actuates the spring-loaded buttons 118 and 119 of normally closed limit switches 120 and 121. These limit switches are enclosed within limit switches mechanism 74. The mechanism shown at the upper right-hand portion of the schematic in FIGURE 8 illustrates the mechanism by which the chair is tilted rearwardly, by the extension of extension arm 52, and is brought back to central or sitting position by the retraction of the extension arm 52.

Actuator 43, through the extension of its extension arm 44, tilts the chair to the right (with respect to the patient sitting therein), whereas retraction of extension arm 44 tilts the chair to the left. Actuator 43 may be identical to actuator 49 so far as its included gear reduction means 112 and extension arm 52 are concerned, except that in the case of actuator 43, the cam 117 of extension arm 52 is not included. Rather, extension arm 44 is provided with a transverse pin 53 which journals limit switch extension rod 58. This rod is journaled in an appropriate sleeve 59 and is adapted for slidable movement within the limit switch mechanism 60. Extension rod 58 includes an indented, recessed margin 122 which, upon contact with switch arm roller 123 of switch arm 124, will allow the arm 124 and the contact arms 125–128 physically ganged thereto to spring outwardly, toward arm 124, so as to enable the contact of arms 125 and 126 with contacts 129 and 130, and simultaneously to release contact of arms 127 and 128 with the switch contacts 131 and 132. Leads 200–203 are connected to contact 132, to junctions 147 and 204, to mercury switch 72, and to terminal 7 in the manner shown. Lead 133 is connected between the power motor terminal, of motor 111, of actuator 43 and switch arms 125 and 128; correspondingly, lead 134 is connected between the remaining power side of motor 111, of actuator 43, and switch arms 126 and 127. It should be mentioned at this juncture that the motors as at 111 of both actuators 49 and 43 are double winding motors such that the supplying of voltage from the power supply to one power lead of the motor will cause the same to rotate in one direction, whereas the supplying of power to the remaining power lead will cause the motor to rotate in the opposite direction. Motor 111 leads 149 and 105 are grounded. Lead 134' is coupled between contact 129 and contact 135 of normally closed limit switch 62; switch arm 136 of switch 62 is directly connected by lead 137 to terminal No. 2 of terminal bus 86. In a similar manner, lead 138 is directly connected to contact 139 of limit switch 63 which is normally closed. Switch arm 140 is connected by lead 141 to terminal 6 of bus 86. Again, limit switch 62 and 63 are normally closed, and the fingers 64 and 65, which are spring loaded outwardly, upon depression, selectively, will serve to open these respective limit switches. Lead 142 interconnects junction 143 and mercury switch 71 at terminal 144 thereof. Remaining terminal 145 is connected by lead 146 to junction 147 and also to junction 148 and terminal 99 of switch 98. Lead 149 is a ground or common reference potential lead interconnecting the ground terminals of motors 111 of the two actuators 49 and 43 and is common to junction 106 and lead 105. Lead 150 interconnects one power terminal of motor 111 and switch arm 151 of switch 121. Contact 152 of switch 121 is connected by lead 153 to junction 154. In a similar manner the lead 155 is connected to the other power terminal of motor 111 and interconnects the same with switch arm 156 of switch 120. Contact 157 is coupled by a lead 158 to junction 159 which is common to terminal 1 of bus 86.

The electrical system shown in FIGURE 8, in conjunction with the structure therein shown and also illustrated in FIGURES 1–3, illustrate one form of the invention wherein a particular sequence of operation is predetermined. Other arrangements are of course possible; however, it is believed that the present sequence of

operation is very much to be desired, for therapeutical considerations.

At the outset it is noted that plug **107** supplies alternating current to the synchronous motor **61** and also to transformer **103**. Thus, the motor **61** is supplied power, and pulsating directive current at lower voltage is supplied to the control system by virtue of the inclusion in the circuit of transformer **103** and rectifier **101**. The output through rectifier **101** may be filtered by suitable filter means if desired. The system is so set up that, immediately prior to the engagement of cam **77** with microswitch #1 the chair will be in a central sitting position. This means that extension arm **52** will be completely retracted so that cam **117** will be in engagement with button **119**, opening limit switch **121** and leaving limit switch **120** closed. When cam **117** is disengaged from limit switch **120** so as to enable the contacts thereof to close, then current will flow through lead **78** to terminal **1**, when cam **77** engages and thereby closes microswitch #1, and from thence will proceed via juncture **159** and lead **158** through the contacts of normally closed switch **120** and from thence will continue through lead **155** to power motor **111** of actuator **49** such that the output gear **113** will rotate so as to extend the extension arm **52** within sleeve **116**. Thus, extension arm **52** proceeds upwardly so as to tilt the chair to a back-central position. This movement continues until cam **117** engages button **118** so as to open the circuit to motor **111** at lead **155**. Power at this juncture is not supplied lead **150** leading to the other side, that is, the oppositely revolving power side of the motor, since lead **153** is not at this time supplied power through terminal **8** of terminal bus **86**, or otherwise, since switch arm **100** is in regular operating position and since microswitch #8 is now open.

The chair will remain in its now backwardly tilted position until cam **77** engages microswitch #2, at which time this microswitch closes so as to supply power to terminal **2** of terminal bus **86** and from thence through lead **137** and through normally closed switch **62** to contact **129**. At this juncture it will be noted that roller **123** is in a central position and is extended outwardly into recessed margin **122** such that switch arm **125** engages contact **129**; thus, power is supplied to power motor lead **133** to power motor **111** of actuator **43** such that the extension arm **44** extends outwardly, thus tilting the chair from its rear central position to a rear-right position. Movement of the chair continues until spring-loaded finger **64** of switch **62** engages support plate **27**, at which point this circuit is open and the chair stops its travel. This chair disposition remains until cam **77** engages microswitch #3, at which point power is supplied by terminal **3** to junction **143** and to contact **130** which, because of the outward extension of the limit switch extension rod **58** and the outward position of roller **123**, will conduct through arm **126** to the opposite power lead **134** so as to drive motor **111** of actuator **43** in the opposite direction. Thus, the chair commences to proceed from its extreme rear-right position back to the central rear position and, when such is achieved, the switch arm roller **123** commences to ride up rod **58** and, thereby, to open contacts **129** and **130** with respect to arms **125** and **126** and, simultaneously, to close arms **127** and **128** with contacts **131** and **132**. Thus, the chair is stopped in its return to rear-central position, at rear-central position, by virtue of the cam-configuration of limit switch extension rod **58**.

The circuit condition shown in FIGURE 8 illustrates the disc as being rotated such that cam **77** now is about to engage microswitch #4, thereby closing the same to supply power through terminal **4**, junctions **154**, lead **153**, the normally closed switch **121** and lead **150** to motor **111**. This energizes one of the power windings of motor **111** to rotate output gear **113** appropriately for retraction of extension arm **52**. The chair will tilt forwardly and, when cam **117** engages spring-loaded button **119** at switch **121** the switch will be opened to deenergize motor **49**, thus maintaining the chair in an upright sitting position.

The motor **61** continues to revolve disc **76** so that cam **77** now engages microswitch #5. This supplies power through terminal **5** to junction **159** and thence through lead **158** and through normally closed switch **120** to power lead associated with motor **111** of actuator **43**. return to the center rear position for the chair until extension arm **52**, in traveling upwardlly, engages switch button **118** so as to open switch **120**.

The motor **61** continues to rotate until, ultimately, microswitch #6 is engaged. The closing of this microswitch supplies power through terminal **6** and lead **141**, through limit switch **63** and from thence via lead **138** to contact **131** and from thence through arm **127** to one power lead associated with motor **111** of actuator **43**. Thus, the actuator **43** retracts inwardly so as to pivot the chair to the patient's left. This continues until plate **27** engages spring-loaded finger **65** of limit switch **63**, at which point this switch opens so as to cut off power to motor **111** of actuator **43**. The motor **61** and disc **76** continue to rotate until cam **77** engages microswitch #7, at which point the power supplied through terminal **7** of bus **86** and from thence upwardly via lead **200** to contact **132**, and from there through contact arm **128** to the opposite power lead i.e., **133** this time, to motor **111** of actuator **43**. This serves to extend the extension arm **44** and, simultaneously, limits the switch extension arm **58** until the latter goes upwardly such that the ball **123** of switch **60** extends outwardly at indented margin **122**. This opens the motor circuit by virtue of the leftward movement of the associated switch arms of switch **60**.

At this juncture it will be noted that the chair has been returned to back-center position. Return of the chair to center, erect position is accomplished, as will now be seen, through the closing by cam **77** of microswitch #8 as the motor **61** continues to revolve. This supplies power through terminal **8** to juncture **154** and from thence upwardly via lead **153**, through switch **121**, and from thence via lead **150** to the motor so as to retract extension arm **52**. Again, this will continue until cam **117** engages button **119** of switch **121**, at which point this motor circuit as via lead **150** will open.

Thus far we have followed the cycle through the regular setting of switch **98**. Of course, the entire system can be turned off by the movement of arm **100** between contacts **97** and **99**. There is also included an attendant circuit, and the entire system may be switched from regular position to the attendant circuit position by the movement of arm **100** to engage contact **99**. Upon such movement, then, power supplies junctions **148**, **154**, and also junction **147**. The latter junction supplies power to mercury switches **71** and **72** which are mounted as shown in FIGURE 4. The mercury switches are so constructed that at a chair-erect position there will be no conduction through either mercury switch. However, when the chair is either tilted to the right or to the left, power will be supplied the respective mercury switch. It will be noted with reference to merucry switches **71** and **72** that the tilting of the chair will uniquely affect the electrical condition of the respective switches.

Switch **32**, see FIGURES 8 and 4, will be electrically closed by the mercury contained therein when the chair has been tilted to the left. Thus, when the attendant switch is to contact **99** of switch **98**, mercury switch **72** will conduct so as to supply power through contact arm **128** to one side of the motor **111** of actuator **43**. It is to be noted that there is a direct coupling between the mercury switch **72** and terminal **7** on bus **86**. It will be remembered that powering this terminal will pivot the chair from left to right until a central position is reached. This is the same in the case of the operation of mercury switch **72** also, and since this switch will return to a non-conducting state, owing to the displacements of mercury

surface level, once the chair has achieved its central position.

Mercury switch **71** is connected to contact **130** and through arm **126** to motor **111**. Thus, power will be supplied the motor **111** of actuator **43** when the chair is tilted to the patient's right, this by virtue of the action of mercury switch **71**. Again, this circuit will open upon return of the chair to a central position by virtue of nonconduction through the mercury switch at that position.

It will be noted that at the attendant position of switch **98**, junction **154** receives power. This power is transmitted along lead **153** and proceeds through switch **121** to motor lead **150** of motor **111**. This serves to retract extension arm **42** until cam **117** actuates spring loaded button **119** of switch **121**, at which point the chair will be in a central position. Thus, the closing of the attendant circuit not only returns the chair to a central position relative to right-and-left movement, but also returns the chair upwardly from any rearward displacement which it may enjoy.

In FIGURES 9–12 are illustrated another embodiment of the invention. Chair **160** is the same as chair **11** in FIGURE 1, or may be substantially so in general detail, except for the electro-mechanical tilting system associated therewith.

In FIGURE 9 chair **160** is illustrated a pair of, cylindrically configured, wedge-shaped discs **161** and **162**. The former is attached to the chair **160** by conventional means and is configured to fit the under side of the chair. Wedge-shaped disc **161** is shown in section in FIGURE 12 and is illustrated as being secured to the chair **160** by mounting attachment **164**. Suitable means at **165** is provided for a ball and socket joint, and is shown to include a ball **167** and socket halves **178, 178'** between disc **161** and shaft **166** the end of which is integral with the ball. The ball and socket means shown is conventional and is disposed within bore **168**. Annular bearing rings **169** and **170** are affixed to wedge-shaped members **161** and **162**, respectively, are disposed about shaft **166**, engage each other, and provide a suitable bearing contact between the two discs **161** and **162**. Correspondingly, similar bearing rings **171** and **172** are affixed to wedge **162** and also to plate **173**, which may be circular. Attachments **174** secure sleeve **175** to plate **173**, and sleeve **175** forms an integral part of gear housing **176**, the latter being attached to drive motor **177**. A suitable key at **178** keys the bottom wedge-shaped disc **162** to the shaft **166**. Thus, power supplied to shaft **166** will rotate the shaft and will also rotate the wedge-shaped disc **162** associated therewith so that the latter will revolve between plate **173** and affixed disc **161**. As the wedge-shaped disc **162** continues to revolve there will be displacements in the plane of the top surface **179** of the chair (seat) and of disc **161** and, correspondingly, a simultaneous tilting of chair **160**. The disc **161** in FIGURE 12 will have to rotate a complete 360° in order for the chair to assume its normal upright position as shown in FIGURE 9.

Preferably, the revolving of motor **177** is not continuous. Rather, there is an appropriate timer mechanism that is preferably supplied so that the motor will run intermittently, for predetermined intervals of time, and there will be a predetermined time spacing between motor actuations. As an example, the gearing of the motor **177** and its time sequence of energization may be such, merely by way of example, that the disc **162** will rotate 90° in accordance with the 90° rotation of shaft **166**, during a fifteen minute time interval. The time spacing between motor energization of motor **177** may be controlled by any appropriate means. FIGURES 9A and 9B indicate a timer means of simplified form for controlling motor **177**. Thus, input leads **180** and **181** are connected to plug **182** and lead into auxiliary motor **183**. Shaft **184** of motor **183** is keyed to disc **185** which is of insulative material and which includes inverted-dimple type protuberances **186** which are disposed preferably equidistantly from the center of shaft **181** and which sequently engage protuberance **187** of movable switch arm **188**. The protuberance **186**, upon contact therewith, moves switch arm **186** outwardly so as to engage fixed switch arm **189**, and this causes a closing of the electrical circuit to motor **177**. Leads **190, 191** and **192** complete the circuit as shown in FIGURE 9. The spacing of the protuberances **186** is illustrated in FIGURE 9B.

To complete the structure a suitable stand **193** may be supplied and includes a base **194** and a plurality of legs **195** supporting the central plate **173**, being welded thereto.

For certain types of therapeutic treatment, the system of FIGURES 1–8 may well be preferable. For other types of treatment wherein a cyclical tilting is desired as is accomplished by the structure of FIGURES 9–12, the second embodiment of the invention may well be preferred. Where therapeutic considerations are equivalent, then the structure of FIGURES 9–12 is deemed preferable, owing to its simplicity.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A therapeutic chair including: a unitary frame comprising a seat portion having a front, a rear, and two side extremities, a back portion extending upwardly from the rear extremity of the seat portion, a leg rest portion depending from the front extremity of said seat portion, and a pair of retainer walls positioned one at each side extremity of the seat portion and extending the length of the back, the seat, and the leg rest; a pair of foot rests, each having a substantially flat surface; means mounting each of said foot rests on said leg rest for pivotal movement between a rest position wherein its substantially flat surface extends substantially normal to and below the leg rest portion and an out-of-the-way position wherein said flat surface is positioned substantially flush against the leg rest portion; rigid locking means interconnecting said retainer walls, said rigid locking means extending over said seat portion, whereby a person sitting in the chair is securely held from falling in a forward direction out of the chair; a stand; means interconnecting the frame and the stand and for tilting the frame about a plurality of axes; and means for slowly driving said chair through a predetermined cycle of tilted and upright positions about said axes.

2. A therapeutic chair as claimed in claim **1**, wherein said means interconnecting the frame and the stand includes a rod fixed to the stand and extending across the chair beneath the seat portion; a base plate; means journalling one side of said base plate on said rod; a tubular member on the side of the base plate opposite the journalling means, said tubular member extending normal to the rod fixed to the stand; a corresponding tubular member fixed to the bottom of the seat portion; and a pivot pin interconecting the tubular members on the base plate and seat portion, whereby said chair is rotatable about both said rod fixed to the base and said pivot pin interconnecting the tubular members.

3. A therapeutic chair as claimed in claim **2**, wherein the means for slowly driving said chair through a predetermined cycle of tilted and upright positions includes a pair of electric motors; a reciprocating actuator rod driven by each of said motors; means pivotally connecting one of said motors to the base plate; means pivotally connecting the actuator rod of the motor connected to the base plate to the bottom of the seat portion at a point offset from the axis of the pivot pin; means pivotally connecting the other of said motors to the stand; and means pivotally connecting the actuator rod of the other of said motors to the bot-

tom of the chair at a point intermediate the rod on which the base plate is journalled and the front of the chair.

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