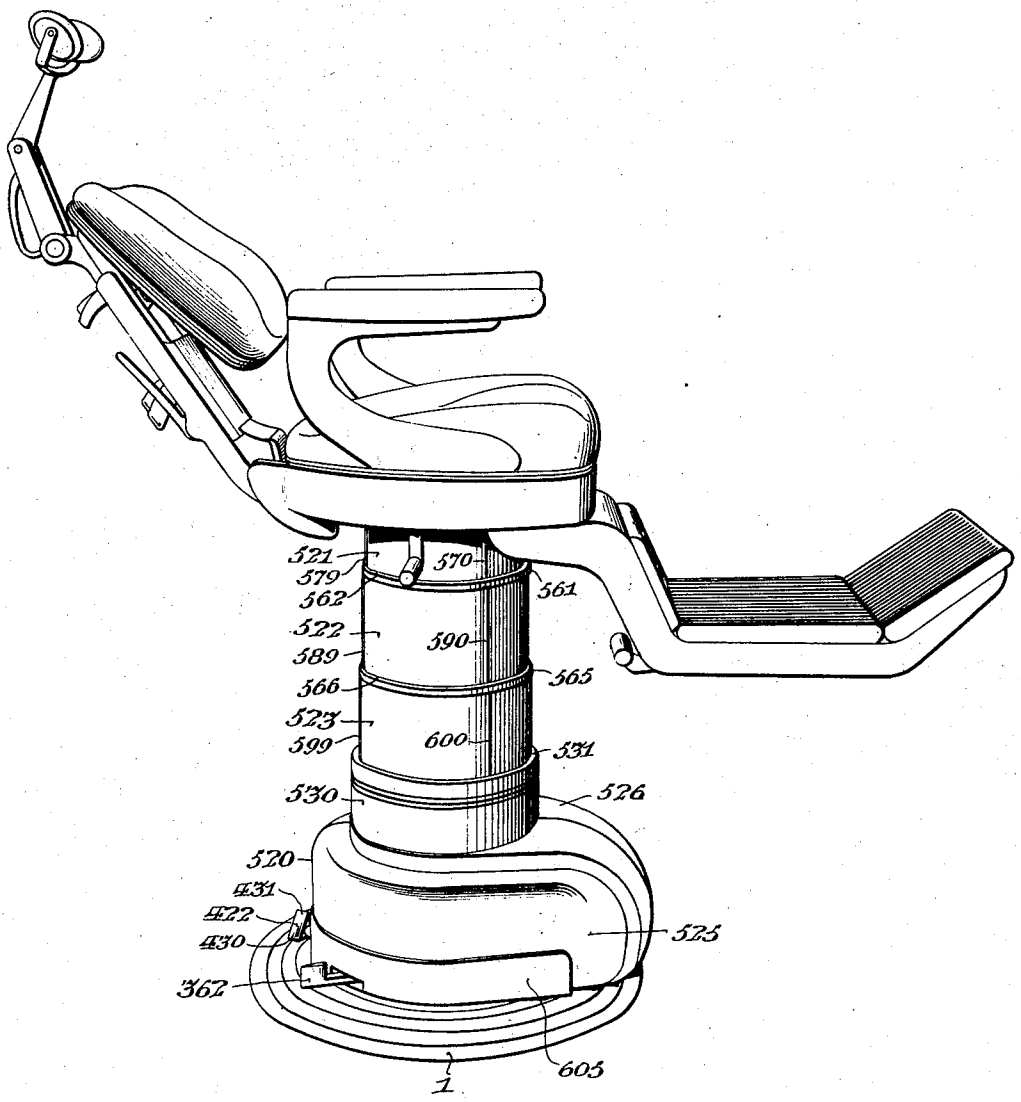
July 4, 1944. R. C. ANGELL 2,352,678

ADJUSTABLE CHAIR

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FIG. 1.



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FIG. 2.

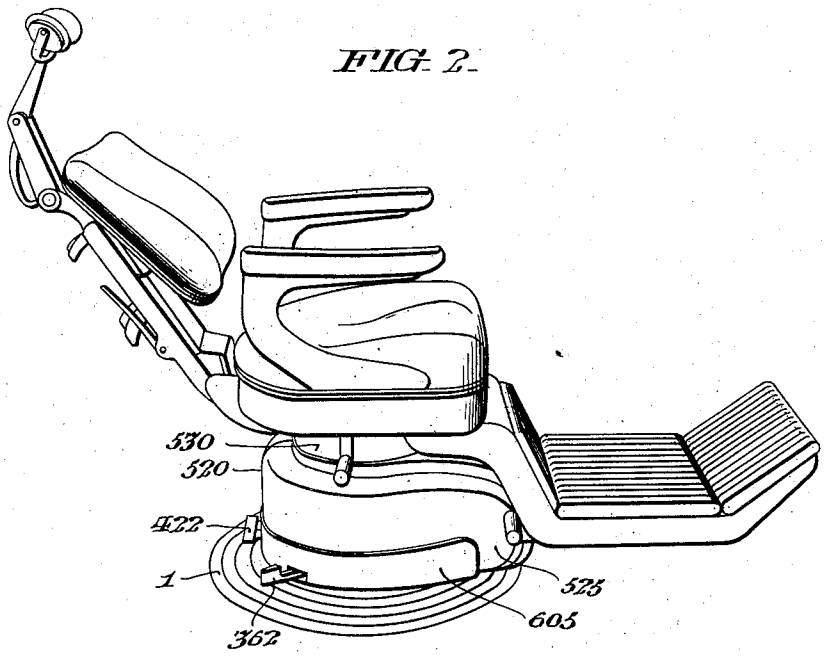
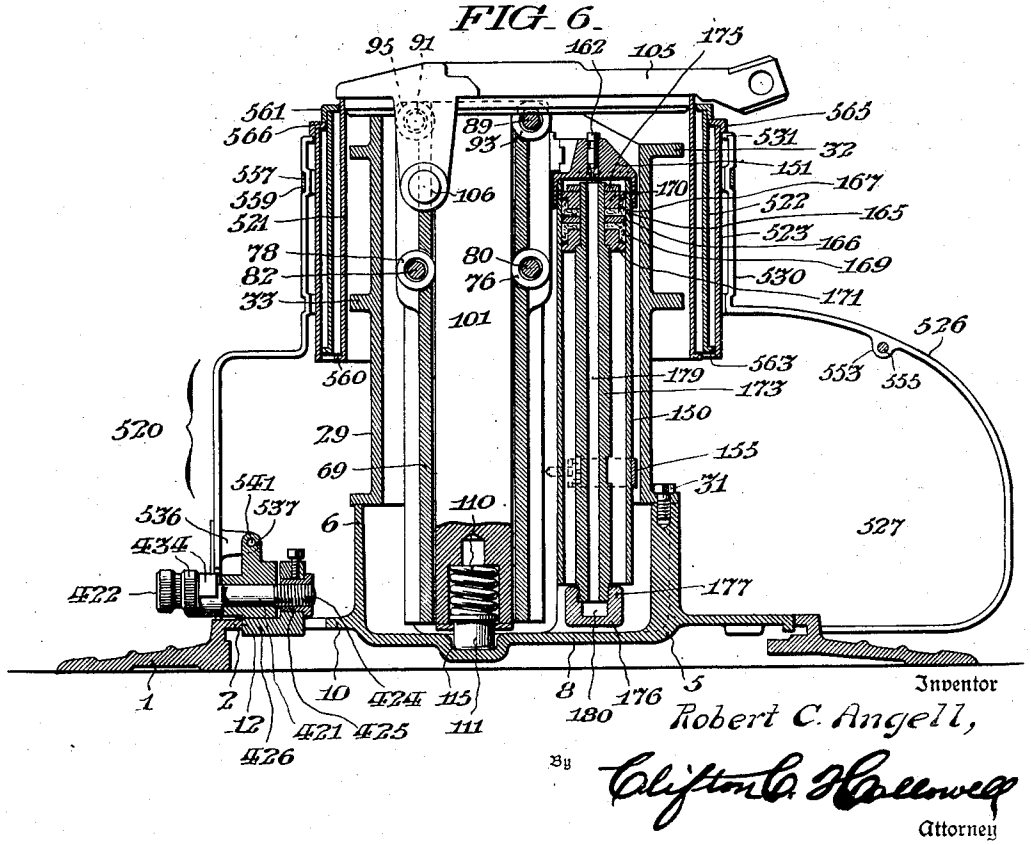


FIG. 6.



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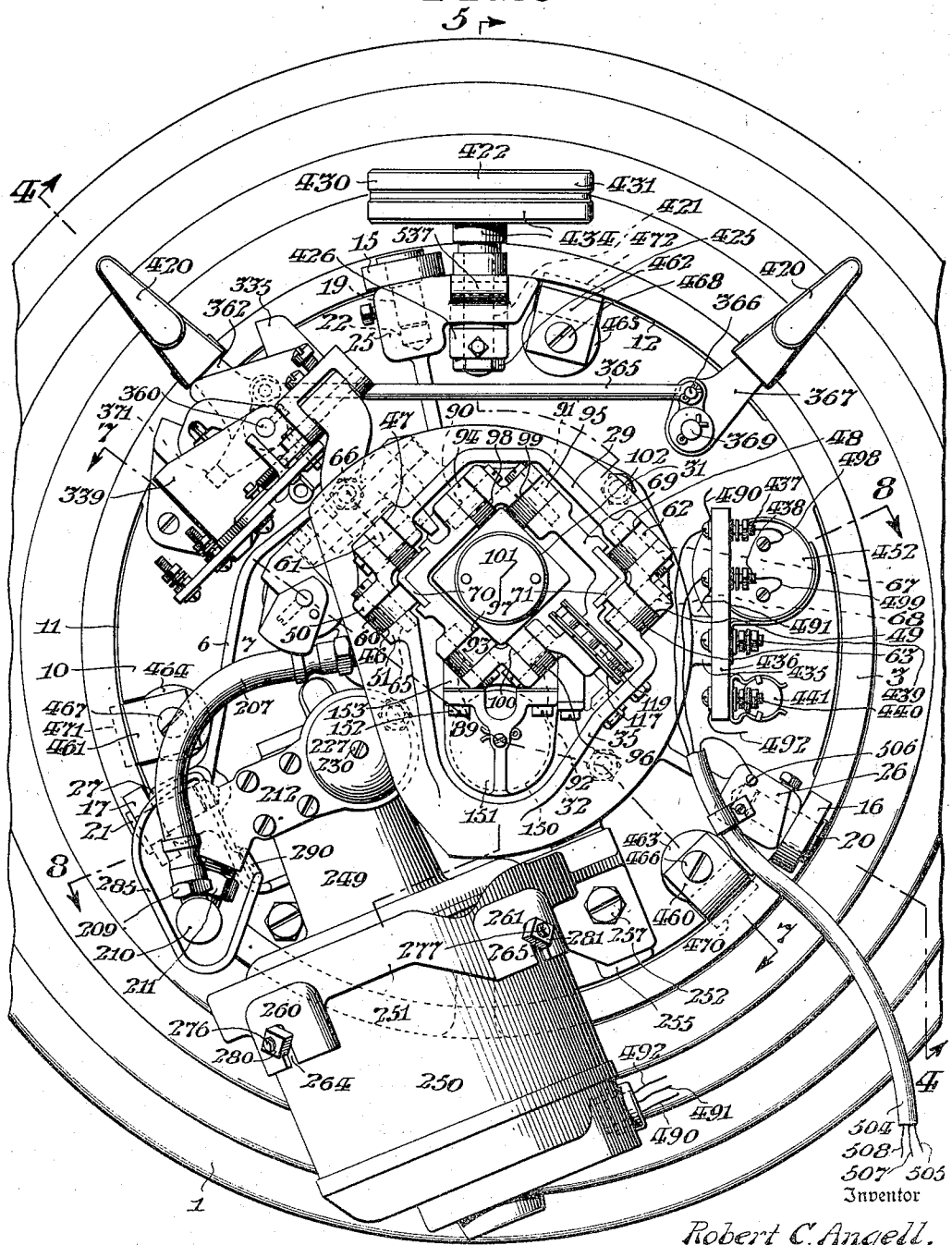
Attorney

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FIG. 3.

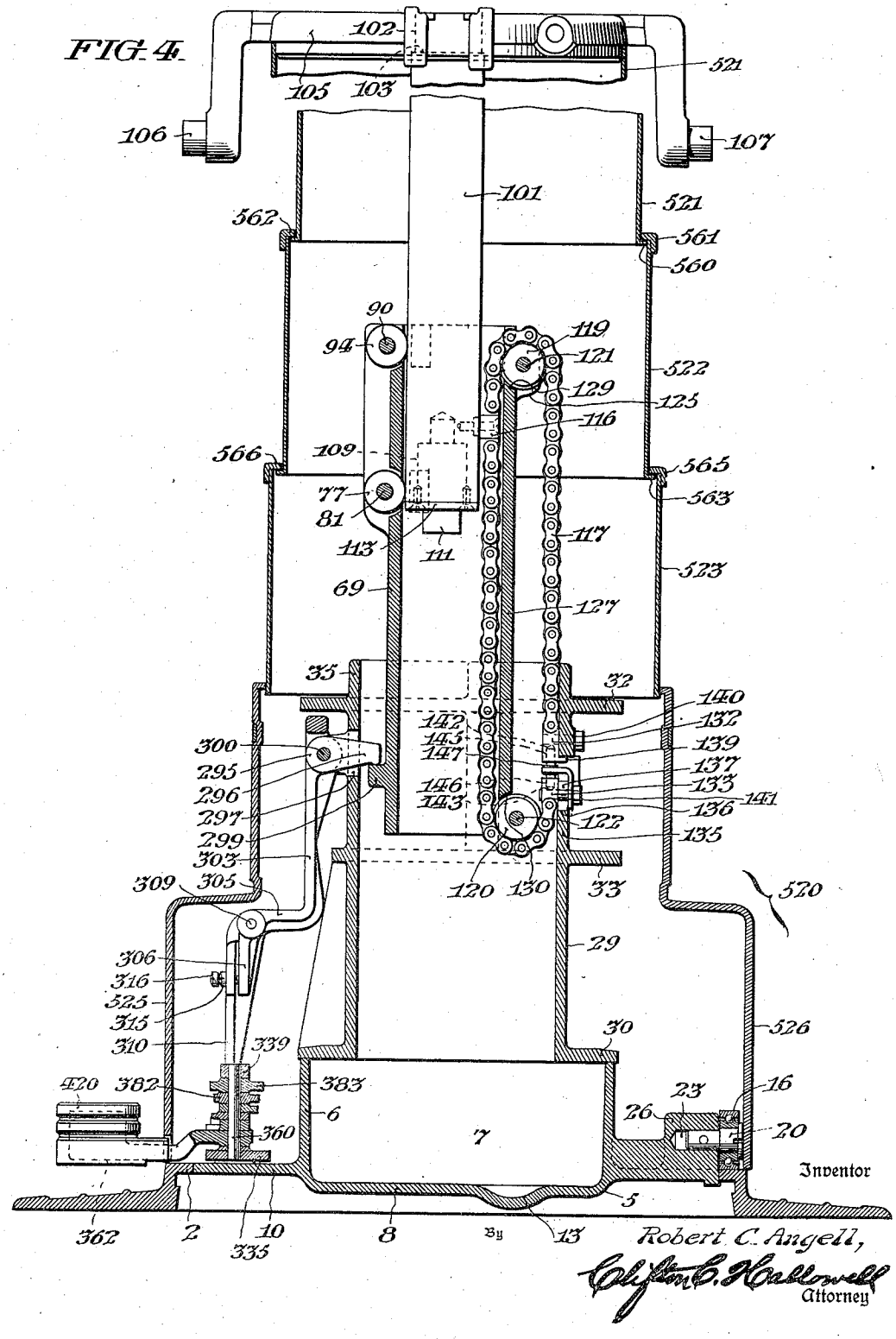


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FIG. 4.

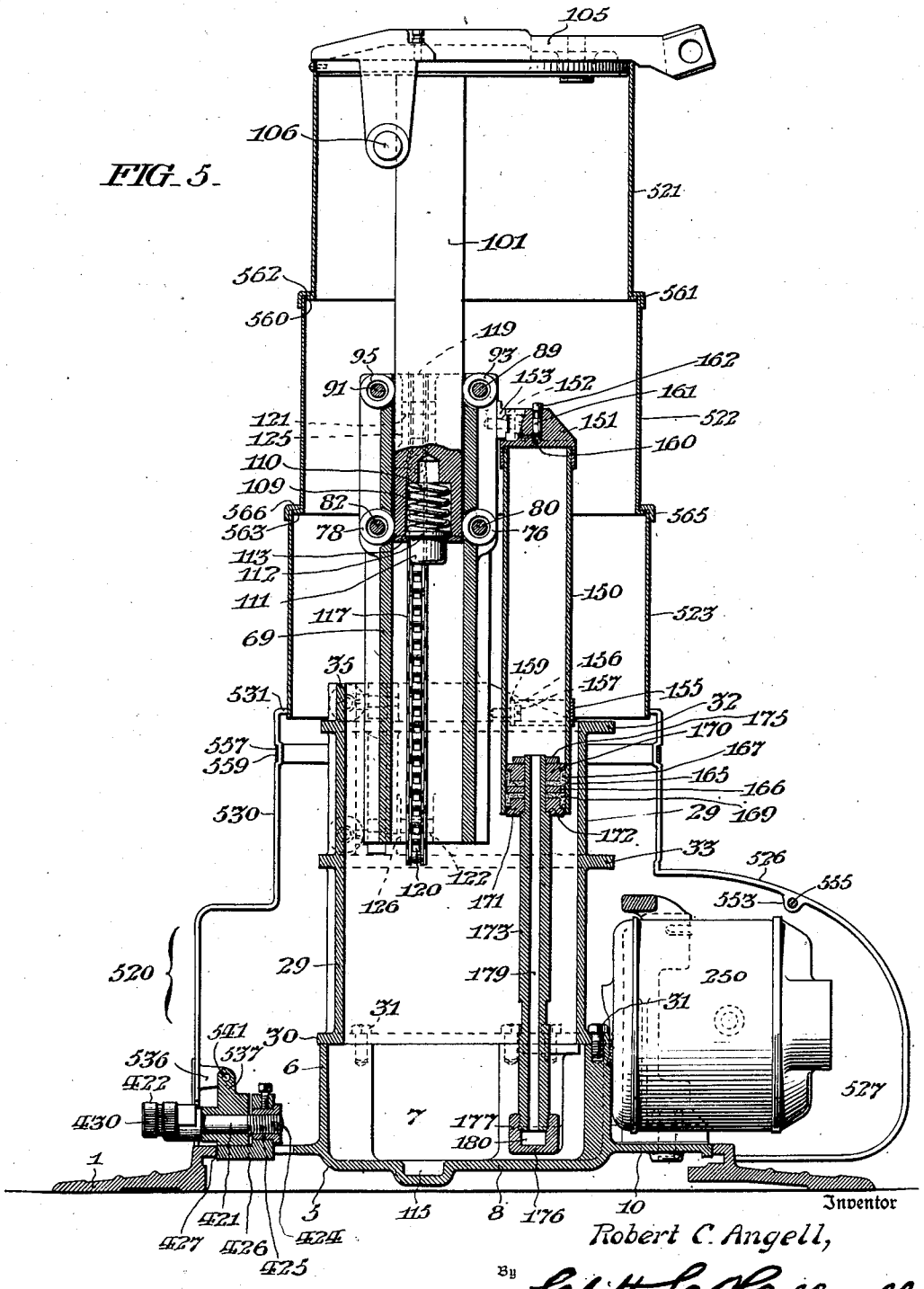


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FIG. 5.



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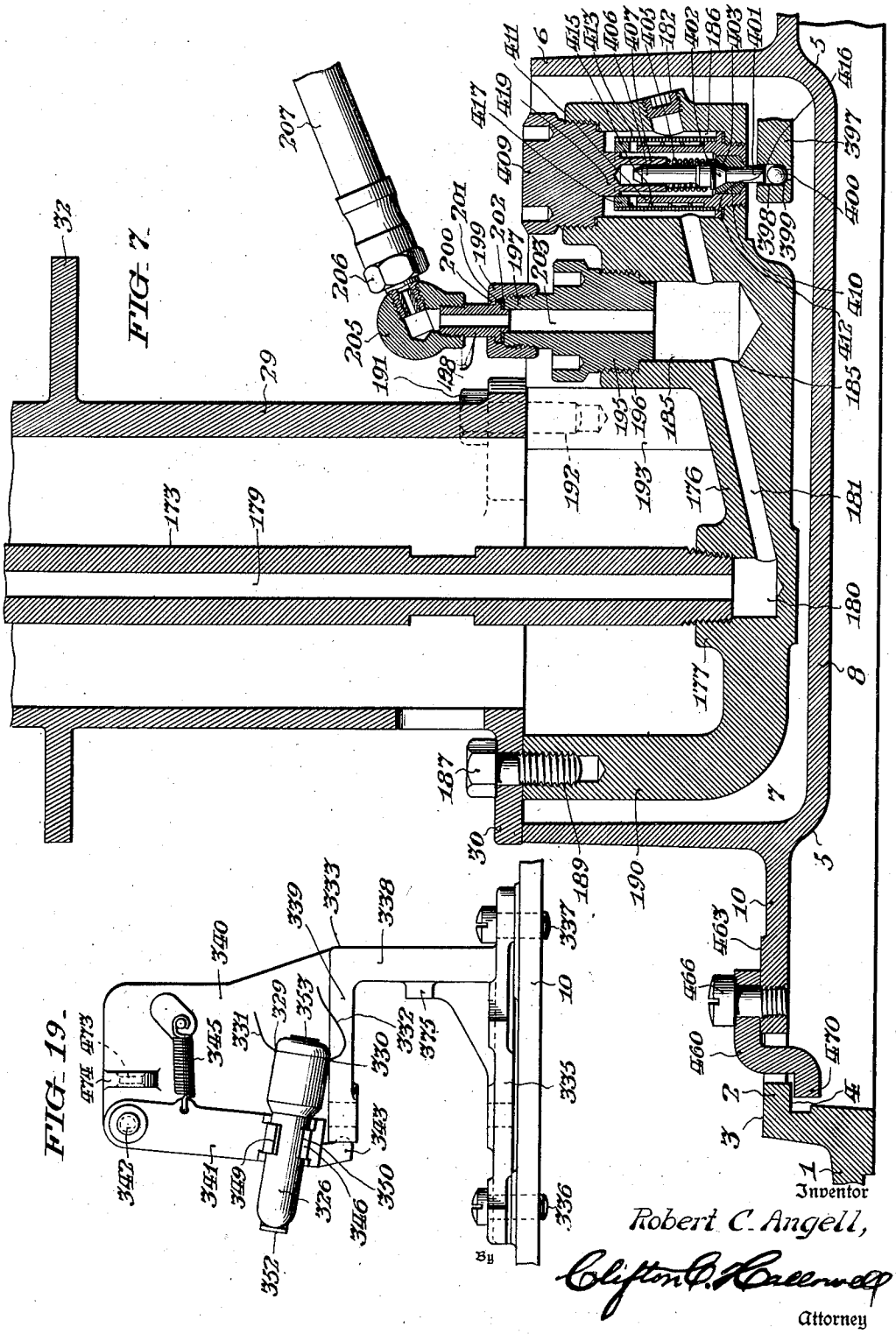


FIG. 7.

FIG. 19.

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ADJUSTABLE CHAIR

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FIG. 20.

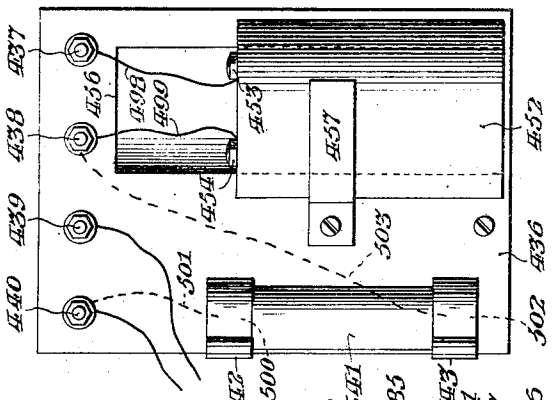


FIG. 8.

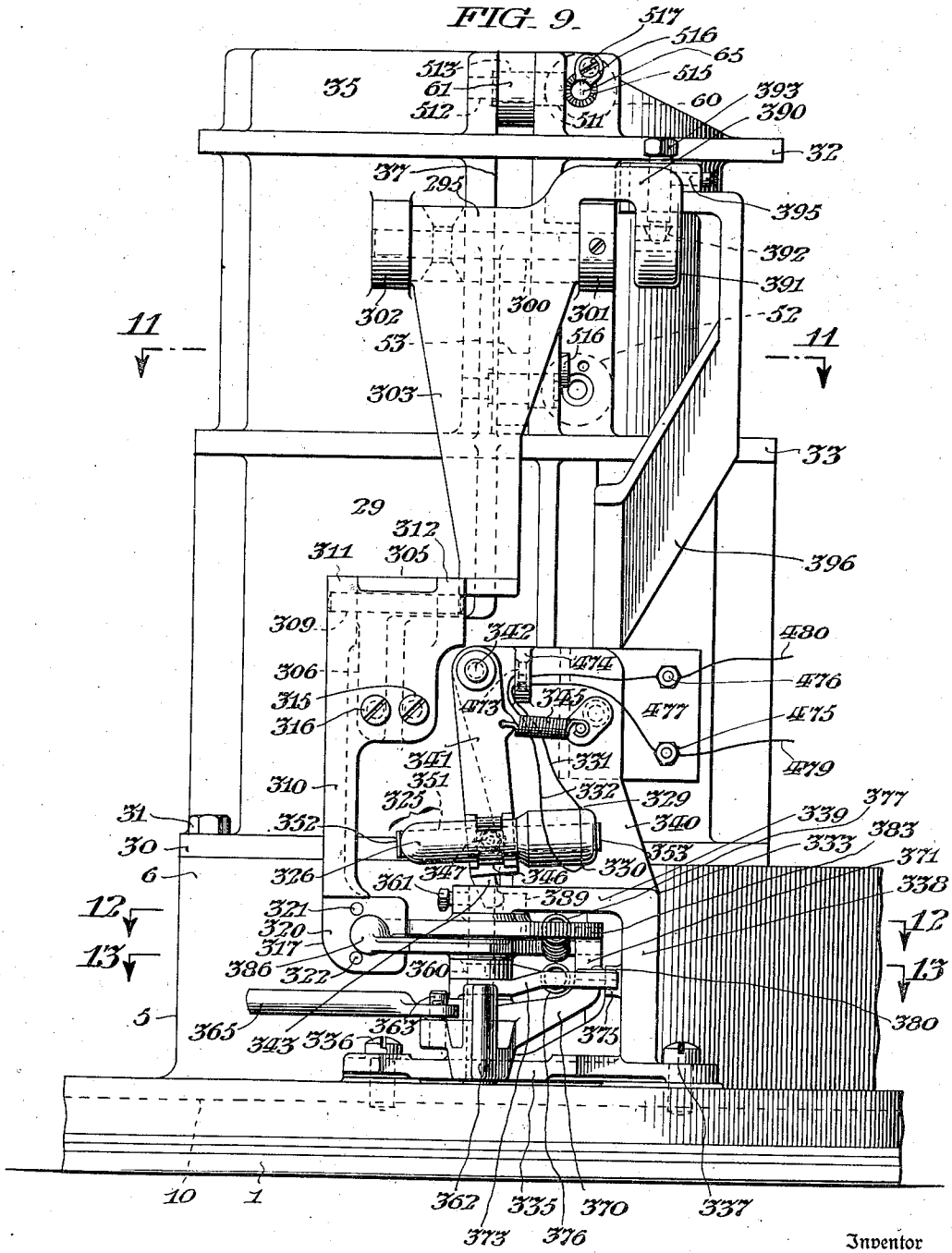
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FIG. 9.



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FIG. 12.

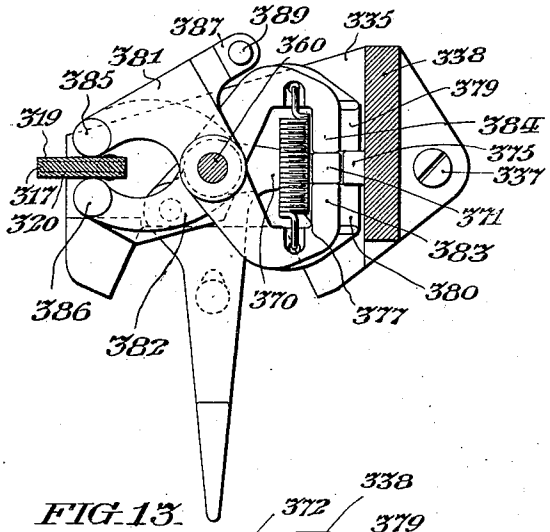


FIG. 10.

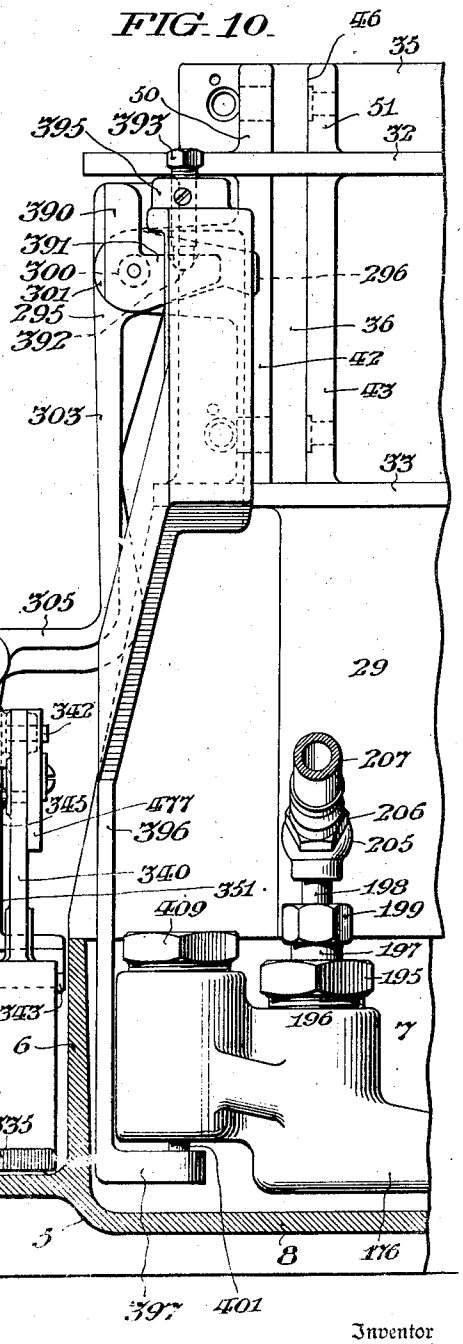


FIG. 13.

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FIG. 14.

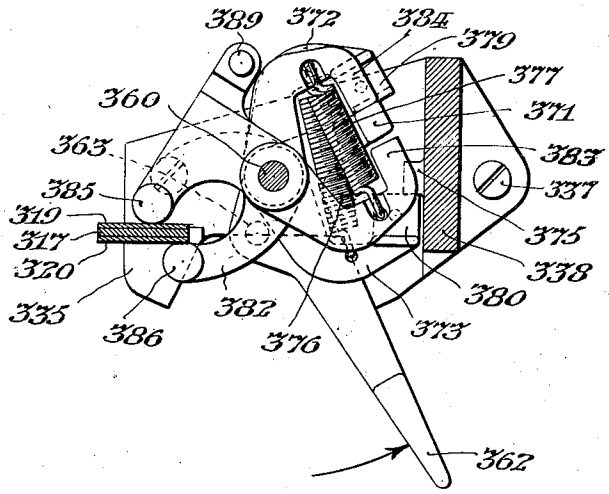


FIG. 15.

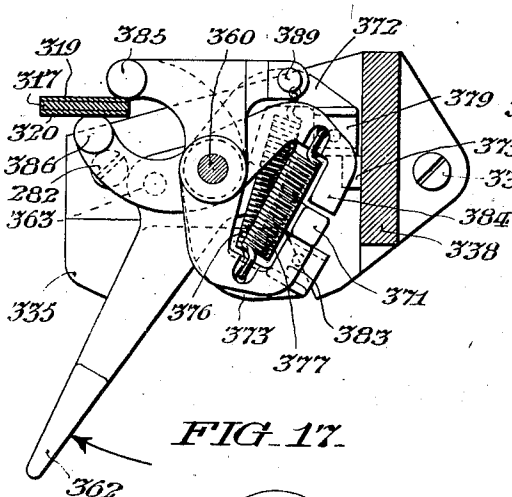


FIG. 16.

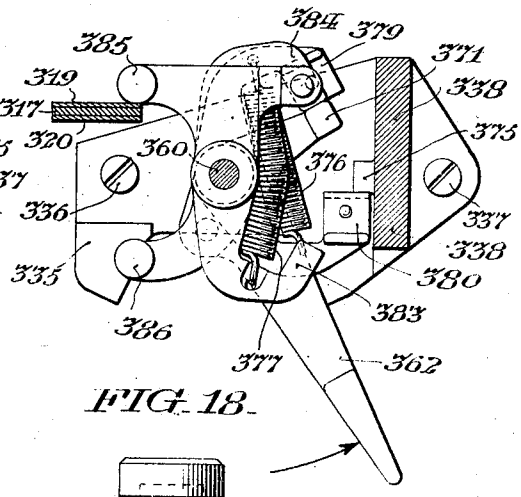


FIG. 17.

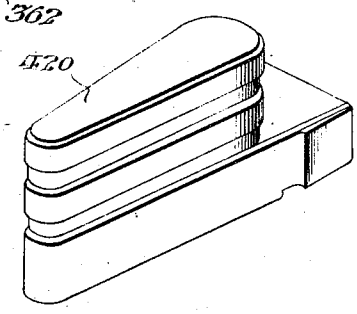
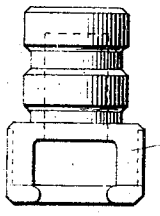


FIG. 18.



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ADJUSTABLE CHAIR

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FIG. 21.

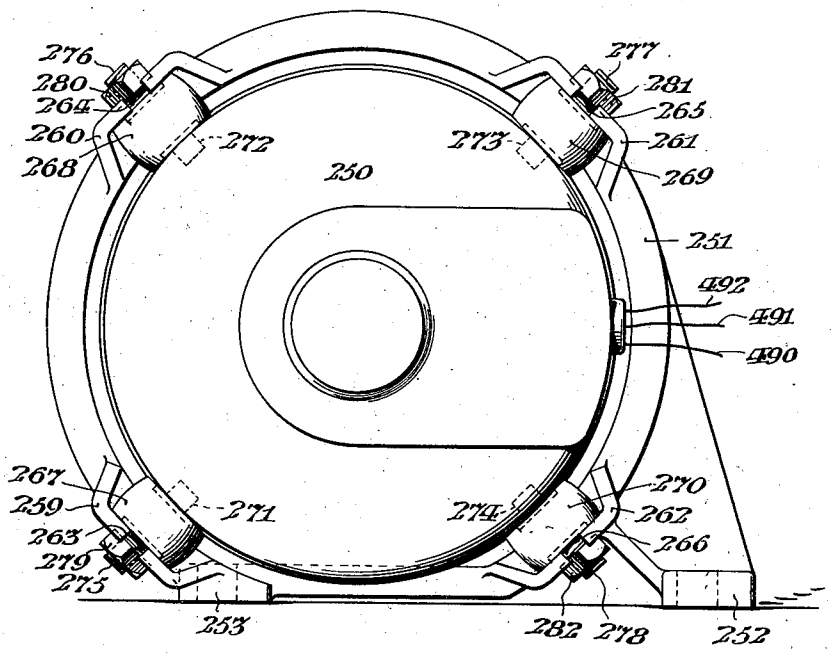


FIG. 22.

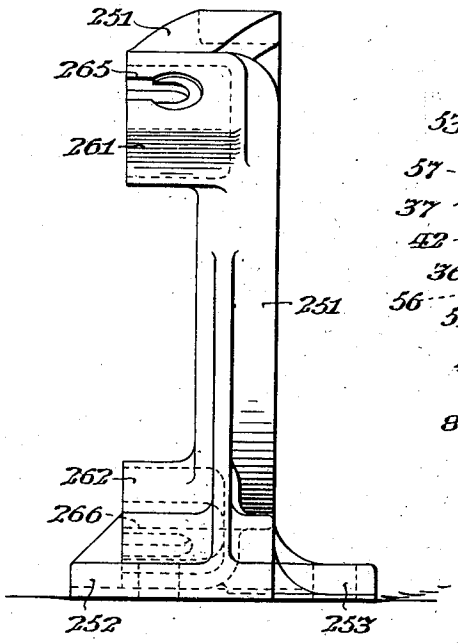
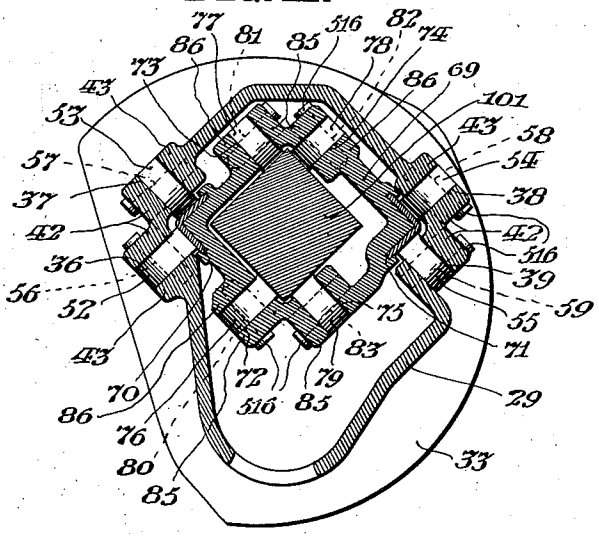


FIG. 11.



Inventor

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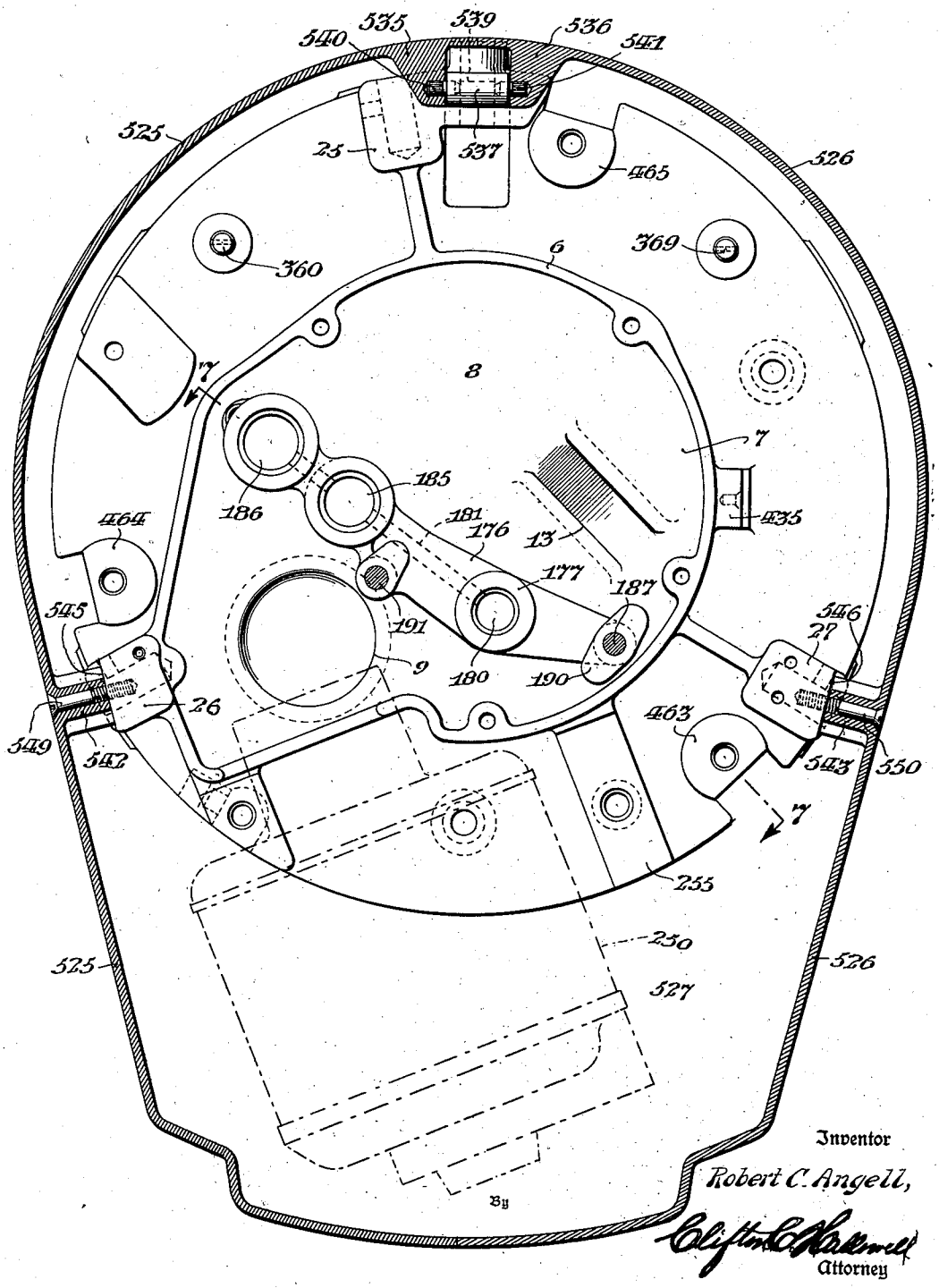
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ADJUSTABLE CHAIR

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FIG. 23.



Inventor

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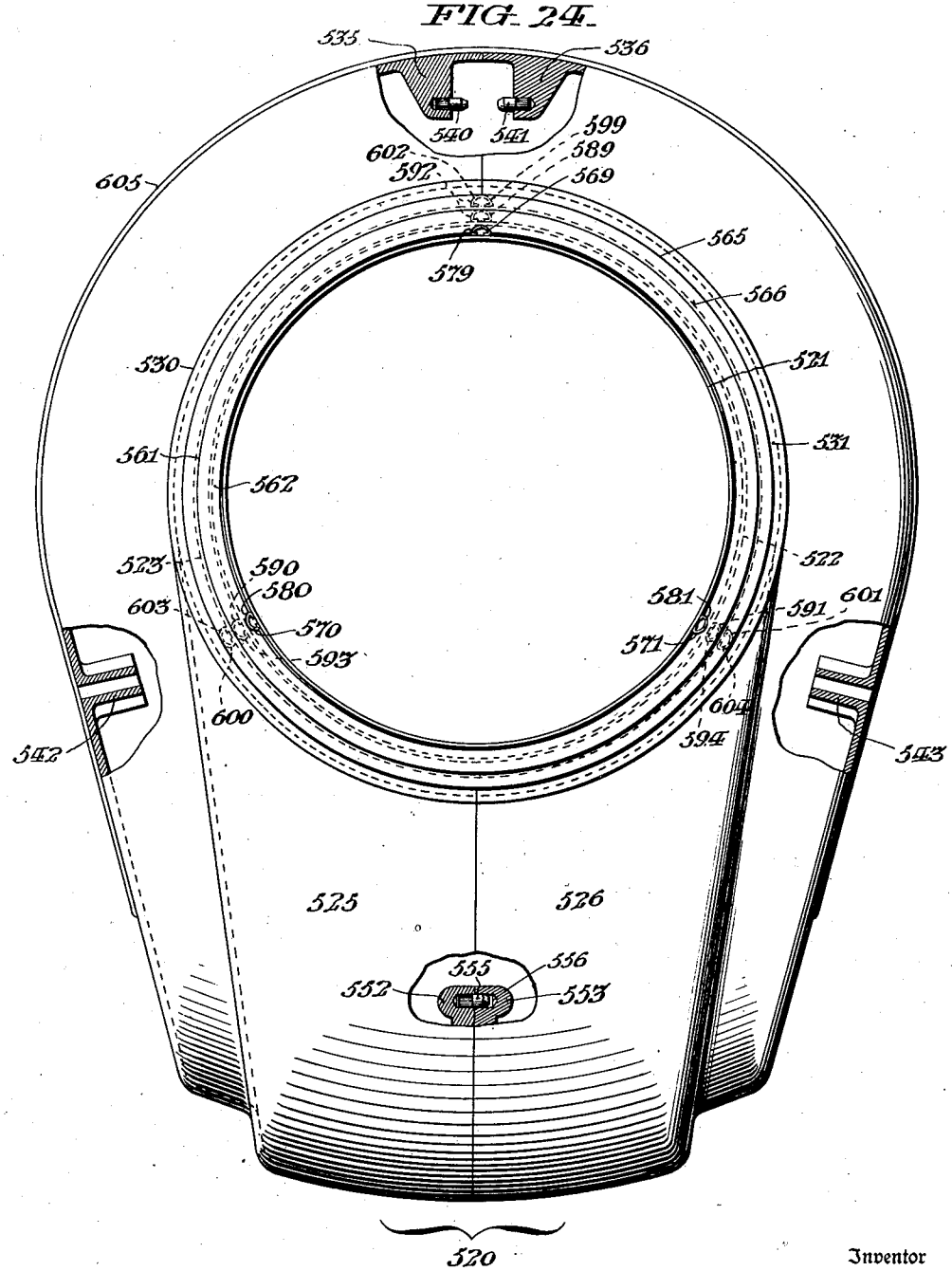
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FIG. 24.



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ADJUSTABLE CHAIR

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FIG. 25.

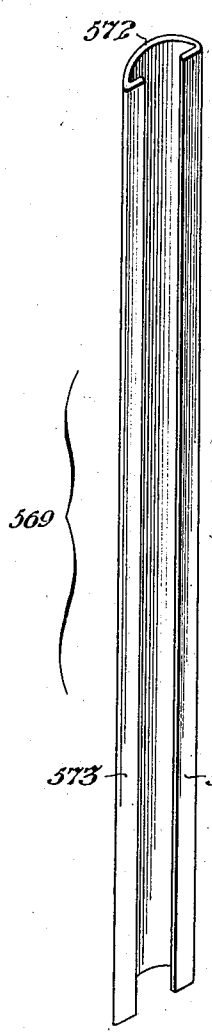


FIG. 26.

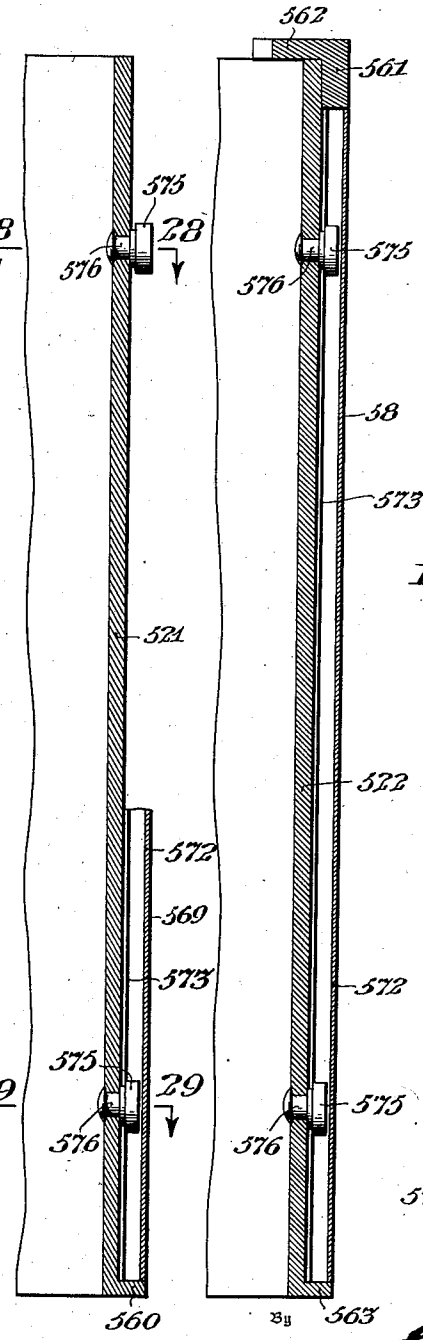


FIG. 28.

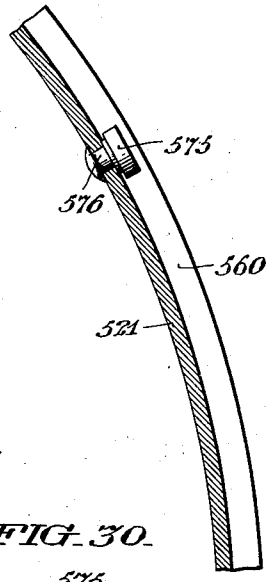
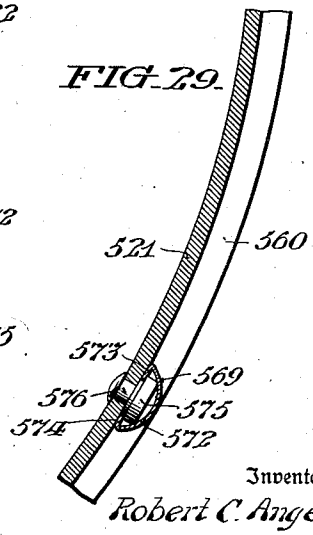


FIG. 30.



FIG. 29.



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Patented July 4, 1944

2,352,678

UNITED STATES PATENT OFFICE

2,352,678

ADJUSTABLE CHAIR

Robert C. Angell, Prince Bay, N. Y., assignor to The S. S. White Dental Manufacturing Company, a corporation of Pennsylvania

Application October 3, 1941, Serial No. 413,448

11 Claims. (Cl. 155—25)

My invention relates particularly to that class of adjustable chairs that are commonly employed by dentists, physicians, barbers, or other practitioners whose operations require that the occupant of the chair be elevated to relatively varying positions, and is especially directed to the mechanism whereby the chair seat and associated parts are raised and lowered.

The principal objects of my invention are to provide an adjustable chair in which the seat raising and lowering mechanism is reduced to a minimum simplicity and in which the operative parts are readily accessible for adjustment, repair or replacement.

Other objects of my invention are to provide an adjustable chair with its seat elevating means so correlated that the raising of the chair seat may be efficiently effected by the employment of a single chain or other flexible connecting element.

Further objects of my invention are to provide an adjustable chair in which the relatively extensible seat supporting pedestal members are guided solely by rollers so relatively disposed as to maintain said pedestal members axially alined while moving up and down without the aid of friction producing relatively sliding elements.

My invention comprehends such an arrangement of balanced associated elements that the seat supporting shaft is disposed to the rear with respect to the axis of the chair proper while its lifting elements including the piston and its cooperative cylinder are disposed forward of said chair axis.

My invention comprises a readily removable and replaceable closure for the operative mechanism that effects the raising and lowering of the chair seat, and includes relatively stationary and movable telescopic sections that afford an envelope that is extensible and retractible in accordance with the movement of the extensible and retractible seat supporting elements.

My invention includes such an arrangement of the cooperative controlling mechanism as to effect actuation of the fluid releasing valve by lifting it from its seat from beneath, and also includes such an arrangement of valve actuating structure as to provide relatively linked foot controlling pedals disposed in convenient positions at relatively opposite sides of the chair base, and so mounted to move about vertical axes that they may be actuated to effect raising and lowering of the chair seat by a lateral movement of the foot of the operator without necessitating said operator raising his foot from the floor and consequently requiring him to balance his body on one foot during actuation of the foot controlling mechanism.

My invention also comprehends a non-vibratory mounting for the power producing unit including the associated motor and pump, comprising a yokelike frame embracing said unit and having relatively spaced independent resilient supports by which said unit is cradled.

The form of my invention as herein more specifically described comprises an adjustable chair having a base upon which a chair frame supporting carriage is mounted to rotate, being supported by rollers arranged to traverse a circular track on said base, and providing a reservoir for fluid, a pedestal frame section carrying an extensible and retractible seat supporting structure including a pedestal sleeve section and a relatively telescoping shaft upon which the seat frame is mounted, said pedstal having connected therewith a cylinder cooperative with a stationary piston whose hollow tubular piston rod projects upwardly from a piston supporting valve body structure which connects said cylinder with a fluid compressing unit including a pump and motor resiliently mounted on said chair frame supporting carriage, and an automatically and manually controlled relief valve for relieving the fluid pressure in said cylinder to effect lowering of the chair seat from an elevated position.

My invention also includes all of the various novel features of construction and arrangement as hereinafter more definitely specified.

In the accompanying drawings, Figure 1 is a perspective view of the adjustable chair constructed in accordance with my invention, and extended to its maximum raised position; Fig. 2 is a perspective view of said chair shown in its lowered or normal position; Fig. 3 is a plan view of said chair with the seat and its cooperative parts, including its supporting cross-head structure removed for convenience of illustration; Fig. 4 is a central diagonal transverse vertical sectional view of said chair exclusive of the seat and its cooperative parts, taken on the line 4—4 in Fig. 3, the seat cross-head being rotated into a front view position for convenience of illustration; Fig. 5 is a central vertical longitudinal sectional view taken on the line 5—5, in Fig. 3, substantially coincident with the axial plane of said chair, but being staggered to bring certain parts of the chair structure into the plane of section; Fig. 6 is a central vertical longitudinal sectional view similar to Fig. 5 but showing the structural parts of said chair retracted to minimum height, cor-

responding to the position of the chair as shown in Fig. 2, and omitting the motor for convenience of illustration; Fig. 7 is a fragmentary vertical sectional view taken on the line 7—7 in Figs. 3 and 23; Fig. 8 is a fragmentary vertical sectional view taken on the line 8—8 in Fig. 3; Fig. 9 is a side elevational view of the frame pedestal section showing a front face of the controlling lever mechanism including the mercury switch which controls the electric motor and its cooperative pump; Fig. 10 is a fragmentary elevational view shown partly in section for convenience of illustration, and showing a side view of the structure illustrated in Fig. 9 as viewed from the right hand side of said figure; Fig. 11 is a plan sectional view of the chair frame supporting carriage taken on the line 11—11 in Fig. 9; Fig. 12 is a plan sectional view of the foot-pedal switch lever unit illustrated in Fig. 9 taken on the line 12—12 in said Fig. 9, and showing the parts in their normally inoperative position; Fig. 13 is a plan sectional view similar to Fig. 12, but taken at a lower level on the line 13—13 in Fig. 9; Fig. 14 is a plan sectional view similar to Fig. 12 but showing the lever shifted to the position wherein the motor is actuated to effect extension of the chair seat raising mechanism; Fig. 15 is a plan sectional view similar to Fig. 12, but showing the levers shifted to the position wherein the chair raising medium is released to permit the chair seat supporting mechanism to descend; Fig. 16 is a plan sectional view similar to Fig. 12, but showing the relation of the levers in event the foot control lever be inadvertently held in position to raise the chair when it has reached the maximum upward movement, and the automatic stop releases the chair raising medium; Fig. 17 is a perspective view of the replaceable yielding foot-pedestal shields shown in plan view in Fig. 3 and in side elevation in Fig. 4; Fig. 18 is a rear elevational view of said shields; Fig. 19 is a front elevational view of the mercury switch supporting frame shown attached to a fragment of the chair frame supporting carriage and illustrating the switch in its operative position; Fig. 20 is a front elevational view of the motor panel, which is shown in plan view in Fig. 3, and upon which the resistor and capacitor are mounted; Fig. 21 is a front elevational view of the motor supporting frame with the motor floatingly mounted therein; Fig. 22 is a side elevational view of the motor supporting frame per se, shown in Fig. 21, as viewed from the right side of said Fig. 21; Fig. 23 is a plan sectional view illustrating the chair frame supporting carriage and showing the means for attaching the lowermost casing section thereto; Fig. 24 is a plan view of the assembled casing per se which envelops the seat raising mechanism; Fig. 25 is a fragmentary sectional elevational view of the uppermost telescopic casing section illustrating the snap-on moulding guide attached thereto, the uppermost portion of which being broken away for convenience of illustration; Fig. 26 is a similar fragmentary sectional elevational view of the uppermost intermediate telescopic casing section illustrating the snap-on moulding guide attached thereto; Fig. 27 is a perspective view of the snap-on moulding which serves as a guide for the cooperative telescopic casing sections to which it is attached as illustrated in Figs. 25, 26 and 29; Fig. 28 is a fragmentary plan sectional view of the telescopic casing section shown in Fig. 25, taken on the line 28—28 in said figure; Fig. 29 is a fragmentary plan sectional view of the telescopic casing section shown in Fig. 25, taken on the line 29—29 in said figure; and Fig. 30 is a perspective view of the headed rivet which serves as an attachment for the snap-on moulding guides, best illustrated in Figs. 25, 26, 27 and 29, but also shown in Fig. 1.

In said figures, the chair base 1 comprises an annulus resting upon the floor and having the inturned flange 2 affording the circular horizontal track 3 provided by its upper surface and a sliding guide 4 provided by its under surface.

Mounted to rotate on said base 1 and depending through the opening therein is the chair frame supporting carriage 5 having its upturned wall 6 forming a fluid reservoir 7 having its floor 8 depending into as close proximity to the room floor upon which the base 1 stands as practical, and provided with a restricted preferably circular depression affording a sump 9.

The chair frame supporting carriage 5 has the peripheral horizontally disposed flange 10; the outer peripheral edge 11 thereof extends into close proximity to the inner edge 12 of the inturned flange 2 of the base 1 and so registers therewith that the upper surfaces of said flanges 2 and 10 preferably extend in a coincident horizontal plane.

Said chair frame supporting carriage 5 is mounted to rotate about its vertical axis, being provided with the ball-bearing rollers 15, 16 and 17 relatively disposed on axes separated by one hundred and twenty degrees, and arranged to traverse said circular track 3. Said rollers are preferably mounted on stud shafts 19, 20 and 21 respectively which are engaged in suitably provided bores 22, 23 and 24 in the respective bearing blocks 25, 26 and 27 respectively extending upwardly from the flange 10, and preferably formed in unitary relation therewith.

The chair frame supporting carriage 5 conveniently supports the frame pedestal section 29, the lower laterally extended flange 30 of which rests upon the upper surface of the upwardly extending side walls 6 of said carriage 5 and is secured thereto by the tap bolts 31. Said frame pedestal section 29 includes an upper laterally extended flange 32 and an intermediate laterally extended flange 33.

The frame pedestal section 29 has its side wall 35 extended upwardly above the flange 32 to a uniform height for the major portion of its circumferential extent, the remaining portion declining to the level of said flange 32, as shown in Figs. 5 and 9. Said frame pedestal section 29 is provided with four narrow vertically disposed openings 36, 37, 38 and 39, respectively extending between the flanges 32 and 33, and each being flanked by the ribs 42 and 43 joining said flanges, as illustrated in Figs. 9 and 11, and is also provided with the openings 46, 47, 48 and 49 alined with the openings 36, 37, 38 and 39, and similarly flanked by the ribs 50 and 51 extending upwardly from said flange 32.

Disposed in the several openings 36, 37, 38 and 39 are the rollers 52, 53, 54 and 55 respectively mounted to rotate on shafts 56, 57, 58 and 59 which are engaged in the respective ribs flanking the said several openings 36, 37, 38 and 39, and said rollers are so disposed as to project inwardly beyond the inner surface of the walls of said frame pedestal section, as may be seen in Figs. 4, 5 and 11.

Similarly, rollers 60, 61, 62 and 63 are disposed in the several openings 46, 47, 48 and 49, and mounted to respectively rotate on shafts 65, 66, 67 and 68 which are engaged in the respective ribs flanking the said several openings 46, 47, 48 and 49, and said rollers, like the rollers 52, 53, 54 and 55, are so disposed as to project inwardly to the

same extent as said rollers 52, 53, 54 and 55, so as to cooperate therewith in guiding and maintaining the relatively movable telescoping pedestal sections in vertical position while traveling up and down with respect to said frame pedestal section, as will be more particularly described hereinafter.

The pedestal sleeve section 69 of the composite pedestal structure is mounted to move up and down within the frame pedestal section 29 and is provided with oppositely directed angular track strips 70 and 71 which are preferably cast integral with the body of the sleeve section 69, and provide a relatively hard and wear resisting sheath for the diagonally opposite exterior corner regions of said sleeve section 69 and serve as tracks for the rollers 52, 53, 54, 55, 60, 61, 62 and 63, as best shown in Fig. 3.

The pedestal sleeve section 69, like the frame pedestal section 29, has its walls provided with apertures 72, 73, 74 and 75 for the rollers 76, 77, 78 and 79 respectively mounted to rotate on the stud shafts 80, 81, 82 and 83 engaged in the parallel ribs 85 and 86 which flank said apertures 72, 73, 74 and 75 and which also carry the stud shafts 89, 90, 91 and 92 on which rollers 93, 94, 95 and 96 extending through the apertures 97, 98, 99 and 100 in the walls of said sleeve section 69 rotate.

As shown in Figs. 3, 4, 5 and 11, the rollers 76, 77, 78, 79, 93, 94, 95 and 96 project inwardly slightly beyond the inner surface of the sleeve section to engage the seat supporting shaft 101 and to maintain it in a true vertical position and to thus guide it in its up and down movement.

Said seat supporting shaft 101 is preferably square in its cross-section and terminates at its upper end in a cylindrical boss 102 which provides a shoulder 103 upon which seat supporting cross-head 105 is mounted, said seat supporting cross-head having the trunnions 106 and 107, upon which the chair seat, not shown, may rock, and being of well known construction, is illustrated in front elevation in Fig. 4 and in side elevation in Fig. 5. In Fig. 4, however, said cross-head 105 is, for convenience of illustration, rotated on its supporting shaft 101, out of its normal position and consequently appears to be slightly off center, as illustrated in Fig. 4.

The chair seat supporting shaft 101, as best illustrated in Fig. 5, is provided with the bore providing the recess 109 in its lower end arranged to receive the buffer spring 110 which bears against the plunger buffer 111 having the peripheral flange 112 normally resting, when said shaft 101 is raised, upon the retaining plate 113. In the lowermost position of the seat supporting shaft 101, the plunger buffer 111 rests in the recess 115 formed by a depression in the floor 8 of the fluid reservoir 7, in which position the spring 110 is compressed and tends to so support the weight of the seat supporting shaft 101 as to assist in starting said shaft 101 and the parts carried thereby in its raising movement.

As illustrated in Figs. 3, 4 and 5, the seat supporting shaft 101 is so connected with the pedestal sleeve section 69 that when said sleeve section is moved up or down, said seat supporting shaft 101 will move relatively up or down therein at double the speed of travel of said sleeve section 69.

As best shown in Fig. 4, the seat supporting shaft 101 is connected by the coupling 116 with the sprocket chain 117 which extends around the sheaves or sprockets 119 and 120 respectively disposed at one side of the upper and lower ends of the pedestal sleeve section 69 and having their shafts 121 and 122 mounted in suitably provided bearing lugs 125 and 126 projecting outwardly from the side wall 127 of said sleeve section 69 and registering with openings 129 and 130 respectively extending through said side wall 127 at the top and bottom of said sleeve section 69, and through which said sheaves or sprockets 119 and 120 are arranged to rotate.

The sprocket chain 117 is also connected at its opposite ends with the couplings 132 and 133 which are engaged with the side wall 135 of the frame pedestal section 29, and said chain ends are maintained at all times stationary while the intermediate portion of said chain 117 is free to travel up and down with the sleeve section 69 and the seat supporting post 101, which movement is obviously effected by the raising and lowering movement of said sleeve section 69.

It may be here noted that the sprocket chain extends both within and without the sleeve section 69 and has its ends joined by relatively adjustable couplings which are arranged to be conveniently adjusted from without the sleeve section 69 and the frame pedestal section 29 without dismantling any of the seat supporting members. As shown in Fig. 4, the pedestal frame section 29 is provided in its upright wall 135 with the aperture 136 through which relative adjustment of the chain terminal couplings 132 and 133 may be conveniently made, and which aperture is extended downwardly in the form of a relatively narrow slot 137.

The chain coupling 132 at the depending terminal region of the chain 117 is provided with the outwardly projecting lip 139 which engages under the uppermost perimetral edge of the aperture 136 and serves to steady said coupling when it is tightly clamped to the wall 135 of the pedestal frame section 29 by the tap bolt 140. The chain coupling 133 at the upturned terminal region of the chain 117 is adapted to adjustably slide up and down upon the inner surface of the upright wall 135 of the pedestal frame section 29 to take up any excess slack or to relieve tension in said chain 117, as may be desired, and said chain coupling 133 is arranged to be secured in such adjusted position by the tap bolt 141, the threaded shank of which extends through said slot 137 in threaded engagement with said coupling 133, as shown in Fig. 4.

Referring further to Fig. 4 of the drawings, the chain couplings 132 and 133 are provided with the oppositely threaded bores 142 and 143 respectively in which the oppositely directed threaded shanks 145 and 146 of the chain adjusting screw are threadedly engaged. Said screw also includes the medial polygonal region 147, preferably hexagonal, with its oppositely directed shanks provided with right and left hand threads respectively so that when rotated it tends to draw together or separate the couplings 132 and 133 and thereby to take up slack in the chain 117 or to relieve tension therein, as may be desired.

Upward movement of the chair seat elevating elements is effected by fluid pressure and is most satisfactorily accomplished by applying lifting power to the pedestal sleeve section 69 to which is attached the vertically disposed cylinder 150 which has its head 151 rigidly engaged by the screws 152 with the laterally extending attachment projection 153 serving as a boss and formed

unitary with said sleeve section 69, as shown in Figs. 3 and 5.

Said cylinder 150 is also engaged intermediate of its length with said sleeve section 69 by the metallic strap 155 which embraces said cylinder and has its outwardly directed end regions 156 engaged by screws 157 with a suitably provided projection 159 formed on said sleeve section 69. The head 151 of the cylinder 150 is conveniently provided with the vent 160 which is arranged to be controlled by the valve comprising the screw plug 161 having the slotted head 162 by which it may be rotated to open or close said vent 160 which is designed to be normally closed.

The cylinder 150 is raised and lowered by cooperation with the piston 165 comprising the central separating disk 166, the packing cups 167 and 169 and the follower plates 170 and 171, all being held together against the shoulder 172 on the tubular piston rod 173 by the keeper nut 175. Said piston 165 is mounted stationary with the chair frame carriage 5 and frame pedestal section 29 while the cylinder 150 is arranged to be raised and lowered together with the chair seat supporting structure comprising the sleeve section 69 and seat supporting shaft 101.

As shown in Figs. 5, 6 and 7, the tubular piston rod 173 is carried by the piston rod supporting valve body structure 176 with which it is threadedly engaged in the boss 177 thereon provided. Said piston rod 173 provides a conduit 179 for conveyance of fluid under pressure to the cylinder 150 and connects through the pocket 180 with the fluid passageway 181 extending through the fluid release valve body structure 176 and closed at its outer end by the screw plug 182.

As best illustrated in Fig. 7, the passageway 181 in the valve body 176 is intercepted by the cylindrical chambers 185 and 186, and said valve body structure 176 is suspended in the fluid reservoir 7 from the superposed pedestal frame section 29 by the tap bolt 187 extending through the flange 30 of said pedestal frame section 29, and into the threaded bore 189 disposed in upturned hanger 190, and by the tap bolt 191 extending through said flange 30 into the threaded bore 192 in the upturned hanger 193.

The chamber 185 is provided with the screw-threaded tubular plug 195 threadedly engaged with the internally threaded upper enlarged region 196 of said chamber and having the upwardly projecting threaded boss 197 with which the short tubular nipple 198 is engaged by the annular collar 199 having the inturned flange 200 engaging the laterally extending flange 201 with the yielding washer 202 interposed between it and the boss 197 to provide a fluid-tight joint for the conduit 203 provided by the tubular plug 195 and nipple 198, as best illustrated in Fig. 7.

Said nipple 198 connects the tubular plug 195 with the hollow spheroidal coupling 205 with which it is threadedly connected and which couples the said nipple with the inner threadedly engaged terminal 206 of the flexible tubular fluid conductor 207 through the outer terminal 209, which is engaged with the hollow cylindrical connection fitting 210, see Figs. 3 and 8, which, in turn, is connected by the union coupling 211 with the check valve housing 212.

As best illustrated in Fig. 8, the check valve housing 212 is directly connected through its passageway 213 with the outlet orifice 214 of the fluid pump 215 upon which it is mounted, with the interposed gasket 216, by the screws 217. Also, as shown in said Fig. 8, the check valve housing 212 includes in its passageway 213 the valve chamber 219 in which the hollow valve plug 220 is threadedly engaged and provided with the reciprocatory plunger type valve stem 221 which is pressed forwardly by the spring 222 so as to yieldingly engage its conical forward end region 223 with the inserted valve seat 224. Obviously, said check valve stem 221 may be forced from its seat by fluid under pressure from the fluid pump 215 when operated, but is adapted to prevent the return of fluid to the pump 215 when said pump is idle.

Referring again to Fig. 8 of the drawings, the check valve housing 212 is extended to provide a base 225 having the annular internally threaded upturned boss 226 with which the air dome 227 is threadedly engaged in fluid-tight relation, said air dome 227 being provided with the relief vent 229 conveniently controlled by the closure screw 230 by which the volume of air in the dome may be varied or the air chamber 231 may be relieved, said air chamber being connected by the fluid conveying passageway 232 with the fluid passageway 213 through the valve chamber 219 and the intercepting check valve including the plunger stem 221 and seat 224.

Referring to Fig. 8, the inlet orifice of the fluid pump 215 is connected by the passageway 233 in the pump inlet fitting 235 through the depending pipe or tube 236 with the fluid strainer 237 which is suspended thereby and which depends into the sump 9 in the floor 8 of the fluid reservoir 7. Said pipe or tube 236, as best illustrated in Fig. 8, is connected at its upper end in screw-threaded relation with said inlet fitting 235 and is provided at its lower end with serrations 239 and preferably terminates in abutted relation to the perforated floor 240 of the strainer 237. Said strainer may preferably be provided, as shown in Fig. 8, with the annular imperforate top plate 241 having the inner depending flange 242 rigidly secured to the pipe or tube 236, and the peripheral depending flange 243 secured in rigid relation to the respective inner and outer relatively spaced perforated concentric cylindrical walls 245 and 246 which are attached at their bottom edges respectively to the strainer floor 240 by the angled annulus 247.

The fluid pump 215, which is of a known commercial type and therefore is not herein described in detail, is particularly adapted to pumping fluid such as oil for compression purposes, and is mounted on forwardly projecting bearing section 249 of the housing of the electric motor 250, with its axis of operative rotation disposed coincident with the axis of rotation of the motor armature so that the motor armature and the pump mechanism may be mounted as a unit and contemporaneously rotated.

As shown in Figs. 3 and 8, the electric motor 250 is so supported as to minimize the consequent vibrations produced incident to the rotation of the motor armature and pressure producing elements of the pump 215. To best accomplish this purpose, the motor is floatingly supported in the motor supporting frame 251, which is substantially annular in form and which is provided with the feet 252 and 253, see Figs. 3, 21 and 22, which respectively rest upon the suitably provided supporting pads 255 and 256 raised in relief from the flange 10 of the chair frame supporting carriage 5, as shown in Figs. 3 and 8, said feet being secured to said pads by the bolts 257 and 258 respectively.

Referring further to the motor supporting frame 251, which, as best shown in Figs. 21 and

22, is generally annular in form and embraces the forward region of the enlarged body portion of the electric motor 250 and is provided with cradles 259, 260, 261 and 262, relatively spaced circumferentially and having slots 263, 264, 265 and 266 respectively, whose longitudinal axes are disposed in planes intersecting coincident with the axis of said motor and cutting a horizontal plane or the floor at approximately forty-five degrees. Said cradles 259, 260, 261 and 262 are arranged to carry resilient motor supporting buffers 267, 268, 269 and 270 respectively which are preferably composed of rubber or other non-resonant material and having embedded therein and projecting therefrom screw-threaded shanks 271, 272, 273 and 274, which may have their projecting ends threadedly engaged with the casing motor 250, and also having embedded therein shanks 275, 276, 277 and 278 projecting outwardly through the slots 263, 264, 265 and 266 in the respective cradles 259, 260, 261 and 262, and rigidly secured to their respective cradles by the nuts 279, 280, 281 and 282. As shown in Fig. 21, the threaded shanks 271, 272, 273 and 274 are in axial alinement with the threaded shanks 275, 276, 277 and 278 but have their approaching opposed ends relatively spaced to prevent vibrations being transmitted therethrough.

Thus it will be obvious from the above description that the power unit including the electric motor 250 and its associated pump 215 are so mounted as to be substantially rigid with the chair seat supporting structure, while the vibrations attendant their actuation will be so completely absorbed by the supporting resilient buffers 267, 268, 269 and 270 as to not be annoying to the occupant of the chair seat.

As the check valve comprising the valve plug 220 and valve plunger 221 must be backed off to release any fluid trapped in the air dome 227, a drip pan or receptacle 285 is provided and disposed in subjacent relation to the outer end of the valve chamber 219, said drip pan being supported by its depending leg 286 which is engaged by the screws 287 with the outwardly extending bearing block 27 which is formed in unitary relation with the chair frame supporting carriage 5 and which projects laterally from the wall of the fluid reservoir.

Said drip pan is provided with the discharge opening 290, see Fig. 3, having the lip 291 extending over said fluid reservoir 7, see Fig. 8, so that any discharge of fluid from the check valve chamber 219 will be caught by the drip pan 285 and directed back into the reservoir 7, as shown in Figs. 3 and 8.

It will be obvious from the foregoing description that the actuation of the pump 215 effects the drawing of fluid from the reservoir 7 through the pipe 236 into said pump, from where it is forced thereby under pressure through the passageway 213, check valve chamber 219, hollow fitting 210, flexible conductor 207, passageway 181, conduit 179 which directs said fluid into the cylinder 150 causing it by cooperation with the piston 165 to rise to the position shown in Figs. 4 and 5 wherein the pedestal sleeve section 69 and seat supporting shaft 101 carrying the seat supporting cross-head 105, have been raised substantially to their maximum elevated position illustrated in Figs. 1, 4 and 5.

When the seat raising parts including the pedestal sleeve section 69 and seat supporting shaft 101 and seat carrying cross-head 105 have been thus elevated to the limit of their upward movement, the elevating mechanism including the motor 250 and pump 215 are automatically rendered inoperative by actuation of tripping mechanism adapted to break or open the electric circuit leading to said motor 250.

The tripping mechanism includes the trip lever 295 in the form of a bell-crank-lever, which has its inwardly projecting arm 296 extending through the aperture 297 in the side wall of the pedestal frame section 29, and disposed in the path of a stop lug 299 formed on the pedestal sleeve section 69 and arranged to be engaged thereby when said pedestal sleeve section is raised to the upper limit of its movement, as best shown in Fig. 4.

As shown in Figs. 4, 9 and 10, the trip lever 295, which is in the form of a bell-crank-lever is mounted to rock on the horizontally disposed shaft 309 which is carried by the relatively spaced bearing ears 301 and 302 projecting outwardly from the side wall of the pedestal frame section 29 upon opposite sides of the aperture 297. The depending arm 303 of the trip lever 295 has the outwardly and laterally projecting shelf 305 terminating in the downwardly extending flap 306. At the angle of the shelf 305 and flap 306, said trip lever 295 is provided with a horizontally extending bore 307 for the pintle 309 for the depending adjustable extension 310 whose relatively spaced ears 311 and 312 straddle the trip lever 295 and rock on the pintle 309, see Figs. 9 and 10 particularly.

Again referring to Figs. 9 and 10, the depending adjustable extension 310 is adjustably engaged with the flap 306 of the trip lever 295 by the set screws 315 and 316, the former being screw-threadedly engaged with said flap while the latter has its forward end engaged with the outer surface of said flap, as best shown in Fig. 10.

Said adjustable extension 310 terminates at its lower end region in a vertically disposed flat web 317 whose opposite sides are faced with thin plates 319 and 320 preferably formed of wear resisting material secured thereto by rivets 321 and 322.

As best shown in Figs. 9 and 10, the trip lever 295, through the depending adjustable extension 310, is arranged to effect automatic actuation of the switch controlling mechanism which determines the position of the mercury switch 325 comprising the mercury containing tube 326 being of well known construction and including terminals 329 and 330 for connection of the electric conductor wires 331 and 332, see Figs. 9 and 19.

The switch controlling mechanism, which will be hereinafter described in detail, is mounted as a unit in the switch controlling mounting bracket 333 whose base 335 is secured by screws 336 and 337 to the flange 10 of the chair frame supporting carriage 5 and whose horizontally disposed bearing shelf 339 is relatively spaced from said base 335 by the standard 338 and is provided with the vertically disposed upwardly extending panel 340, see particularly Figs. 9, 10, 11 and 12.

The mercury containing tube 326 of the switch 325 is carried by the cradle 341 which is swingingly supported at its upper end on the headed pintle 342 projecting outwardly from the upwardly extending panel 340 and which is normally held by the spiral spring 345 in the position shown in Fig. 9 to so incline the mercury containing tube 326 as to maintain the electric circuit between the source of energy and the mo-

tor 250 normally open. Said mercury containing tube 326 is removably held on its cradle 341 by the spring clip 346 which is engaged with the cradle 341 by the bolt 347, and which has its forwardly projecting snap fingers 349 and 350 embracing said mercury tube which is prevented from endwise displacement on said cradle by the retainer 351 having the out-turned abutments 352 and 353 and being engaged with the cradle 341 by the bolt 347.

The alternate or operative position of the cradle 341 and the mercury containing tube 326, in which the electric circuit between the source of energy and the motor 250 is closed, is illustrated in Fig. 19 wherein said cradle 341 and the mercury containing tube 326 have been rocked toward the left to their operative position to effect closing of said electric circuit.

The switch controlling bracket 333 comprising the base 335, standard 338, horizontally disposed shelf 339 and panel 340, includes the vertical shaft 360 mounted in suitably provided apertures in the base 335 and shelf 339 and secured in the latter by the set screw 361. Said shaft serves as an axis about which the several members of the switch controlling mechanism oscillate.

The foot actuated switch controlling pedal 362, shown in neutral position in Figs. 3, 9, 10, 12 and 13, is mounted for oscillatory movement on the shaft 360 and has the upwardly projecting stud 363 which is connected by the link 365 with a similar stud 366 on the relatively spaced auxiliary foot actuated pedal 367 which is disposed at the opposite side of the longitudinal axial plane of the chair for convenience of the operator, and mounted for oscillatory movement on the shaft 369, projecting upwardly from the flange 10 of the frame supporting carriage 5.

Said foot actuated switch controlling pedal 362 has the laterally projecting arm 370 terminating in an upwardly extending finger 371 which cooperates to yieldingly maintain said pedal 362 normally in its neutral position, with the opposed jaws 372 and 373 whose free ends bear against the opposite sides of said finger 371 and also normally bear against the opposite sides of the stop lug 375 which projects forwardly from the standard 338. As best illustrated in Fig. 13, said jaws 372 and 373 are pivoted on the shaft 360 for independent movement and are connected by the spiral spring 376 which tends to yieldingly draw said jaws together.

Said jaws 372 and 373 are respectively provided at their free ends with buffer blocks 379 and 380 of a semi-resilient substance preferably riveted thereto as shown and extended slightly beyond the respective free ends, so arranged as to deaden the noises incident to their contact with the stop lug 375 and the finger 371.

As best shown in Fig. 12, the switch controlling mechanism includes the centrally pivoted switch actuating levers 381 and 382 mounted to independently oscillate on the shaft 369, and respectively having the relatively opposed forwardly extended beaks 383 and 384, and the rearwardly extending tails terminating in opposed preferably globular sliding contacts 385 and 386 which are arranged to bear against the opposite facing plates 319 and 320 of the depending flat web 317 of the depending adjustable extension 310.

Said switch actuating levers 381 and 382 are pivoted for independent movement and are connected by the spiral spring 377 which tends to yieldingly draw said levers together, and to cause their respective beaks 383 and 384 to engage the respectively opposite sides of the upwardly extended finger 371, and also to cause their respective globular tail contacts 385 and 386 to yieldingly engage the respective facing plates 319 and 320 of the depending web 317 of the depending adjustable extension 310.

With further reference to Fig. 12, the switch actuating lever 381 is provided with a lateral extension 387 which inclines upwardly and terminates in a relatively parallel plane slightly above the plane of the lever 381 proper, and said extension 387 carries the upwardly extending stud 389 which is arranged to engage the lug 343 depending from the switch cradle 341 into the path of said stud whereby the anti-clockwise movement of said lever 381 will cause said stud 389 by its engagement with said lug 343 to rock the cradle 341 and mercury containing tube 326 from its inoperative position shown in Fig. 9 to its operative position shown in Fig. 19, wherein the motor 250 and pump 215 are actuated to effect raising of the chair seat. This operative position of the mercury containing tube 326 is effected by movement of the foot pedal 362 to the right as indicated by the arrow and movement of its associated switch control mechanism to their relative positions illustrated in Fig. 14.

When the chair seat is maintained in its raised position by the compressed fluid in the cylinder 150, such pressure may be released and the chair seat lowered by shifting the foot controlled pedal 362 toward the left from its central neutral position shown in Figs. 12 and 13 to its fluid pressure releasing position illustrated in Fig. 15 where the associated parts are so correlated that the lever 382 by its engagement with the web 317 of the depending adjustable extension 310 forces it inwardly, thus rocking the composite rocker arm comprising the trip lever 295, its depending arm 303 and depending adjustable extension 310 on the shaft 300.

As best shown in Figs. 9 and 10, the trip lever 295 is provided with the laterally extended arm 390, having the inwardly projecting finger 391 provided with a depressed pocket 392, in its upper surface, into which pocket 392 the downwardly directed end of the set screw 393, which is adjustably engaged in the bossed head 395 of the depending link 396, projects and is so seated as to support said link suspended for minute vertical adjustment.

As illustrated in Fig. 10, the lower end region of the link 396 depends into the reservoir 7 and has the horizontally extended foot 397 which extends beneath the valve body structure 176, see Figs. 7 and 10. Said foot 397, as shown particularly in Fig. 7, is provided with the through bore 398 having the annular seat 399 on which the thrust bearing-ball 400 rests.

As best shown in Fig. 7, said thrust bearing-ball 400 is normally spaced with sufficient clearance from the depending stem 401 of the fluid relief valve 402 to permit its free seating. Said valve 402 is arranged to be opened by lifting it from its seat 403 in opposition to the spiral spring 405 which encircles the upwardly extending valve stem 406 and extends between said valve 402 and the depending hollow extension 407 of the valve cap 409 into which said stem 406 extends for guidance.

Referring further to Fig. 7, the valve seat 403 is disposed in the annular somewhat resilient valve seat insert 410 in the valve housing 411 which is screw-threadedly engaged in the valve chamber

186, and maintained in fluid-tight relation to the valve body structure 176 by the gasket 412.

The relief valve structure thus described is encased by the cylindrical strainer cage 413 of foraminous sheet material or wire gauze which is maintained in concentric spaced relation to the valve housing by the interposed spacer 415 which may preferably be formed of the spirally coiled wire as indicated in Fig. 7. Said cage 413 is seated at its lower edge on the flange 416 and has the annulus 417 at its upper end which encircles the boss 419 depending from the valve cap 409. From the foregoing it will be obvious that the fluid passing through the relief valve 402 will be free from solid particles that might tend to prevent its proper functioning.

It will also be apparent that the fluid strainer cage 413 may be readily removed for cleaning and replaced by simply removing the conveniently accessible valve cap 409.

Figure 14 illustrates the relative position of the foot pedal 362 and its associated cooperative parts to effect compression of the fluid and consequent raising movement of the chair seat, and Fig. 15 illustrated the relative position of said foot pedal 362 and its associated cooperative parts to effect release of said fluid and the consequent lowering movement of said chair seat.

It is quite possible that the operator of the chair may, through inadvertence, fail to release the foot pedal 362 after the chair seat has reached the upward limit of its movement. In such event, the lug 299 will engage the inwardly projecting arm 296 and cooperate to effect inward movement of the flat web 317, in which event not only will the motor actuating switch comprising the mercury tube 326 be shifted to stop the motor 250 and pump 215, but the relief valve 402 will be opened to permit the fluid to flow back into the reservoir 7, and under such conditions the relative positions of the foot pedal and its associated and cooperative parts are illustrated in Fig. 16.

The switch controlling pedals 362 and 367 may be conveniently provided with the boot or shield 420, which is shown in Figs. 3, 17 and 18, and which may be formed of a resilient material, preferably rubber, so as to be readily slipped over the free end of the pedals 362 and 367 and thereby provide a non-slipping sound preventing contact with the operator's shoe in shifting said pedals to the right or left as may be required to raise or to lower the chair seat.

Rotation of the chair seat supporting structure on the rollers 15, 16 and 17 is arranged to be arrested by the brake mechanism shown in Figs. 3, 5 and 6, which comprises bearing-block 25 for the roller 15 which bearing-block is extended laterally toward the right as indicated in Fig. 3 and also provides a bearing for the brake actuating shaft 421 which is radially disposed and is provided outwardly with the winged foot treadle 422 and has its inner end region provided with screw threads 424 cooperative with the internally screw-threaded bushing 425 which is secured in the brake shoe 426 whose outer surface 427 may be frictionally engaged with the inner face of the inturned flange 2 of the base 1 by depression of the wing 430 which effects a drawing of the brake shoe 426 forwardly against the flange 2, or said brake shoe may be released to permit free rotation of the chair seat carrying structure by depressing the wing 431, best illustrated in Fig. 3. The foot treadle 422 is provided with the boot or shield 434 of resilient material which may be readily slipped on or removed and replaced as desired.

The chair frame supporting carriage 5 is provided, as best shown in Fig. 3, with the outwardly projecting lug 435 to which the motor terminal panel 436 is attached. Said panel 436 is provided with the terminal posts 437, 438, 439 and 440 for connecting the wiring from the motor through the resistor 441 which is supported by the spring clips 442 and 443, and the capacitor 452 having the terminals 453 and 454, said capacitor being retained in the pocket 456 by the spring clip 457, as shown in Figs. 3 and 20.

As shown in Figs. 3 and 7, the rotatable chair structure is prevented from accidental tilting on its base by means of the angled guide cleats 460, 461 and 462 respectively mounted on the bosses 463, 464 and 465, which project upwardly from the flange 10 of the chair frame supporting carriage 5 and on which said cleats are secured by the screws 466, 467 and 468 respectively. As best shown in Fig. 7, said guide cleats 460, 461 and 462 depend downwardly and outwardly so that their free end regions 470, 471 and 472 respectively project beneath the inner peripheral margin of the flange 2 of the base 1.

As shown in Fig. 9, the electric conducting wires 331 and 332 lead to the binding posts 475 and 476 respectively on the terminal plate 477. Said wires 331 and 332 are respectively connected through said binding posts with the wires 479 and 480 which lead to the motor 250 and through which it is energized.

As illustrated in Fig. 3, the wires 490, 491 and 492 leading from the motor 250 respectively connect with the binding posts 437, 438 and 440. The capacitor 452 has its terminal 453 connected by the wire 498 with the binding post 437, and has its terminal 454 connected by the wire 499 with the binding post 438. The spring clip 442 is connected through its terminal 500 by the wire 501 with the binding post 440, and the spring clip 443 is connected through its terminal 502 by the wire 503 with the binding post 438.

The lead-in wires which supply power to the motor are directed through the conduit 504 and comprise the wire 505 which is connected with the bearing block 26 by the screw 506, the wire 507 which is connected to the binding post 438, and the wire 508 which is connected with the binding post 437.

It is highly essential that the roller guided pedestal sleeve section 69 and the seat supporting post or shaft 101 shall be guided by the guiding rollers with maximum accuracy to insure their proper axial alinement and to prevent wabbling of the seat thereon supported, therefore, the roller shafts 56, 57, 58, 59, 65, 66, 67 and 68 may be formed as illustrated in Fig. 9, wherein the shaft comprises axially alined cylindrical end regions 511 and 512 of relatively different diameter and the relatively eccentric intermediate region 513 which provides the arbor on which the rollers revolve. Obviously, a slight rotation of the shaft will shift the axis of the eccentric region to adjust the roller in or out as desired. As shown in Fig. 9, the outer end of said shafts may be prevented from accidental rotation, when set, by having their outer ends provided with serrations 515 which may be engaged by similar serrations on the contiguous face of the retainers 516 which are held, with said serrations interengaged, by the screws 517.

The chair elevating and lowering mechanism

is conveniently enclosed by a readily removable and replaceable casing in the form of a shell which completely envelops said mechanism irrespective of the position of the chair seat. Said casing comprises the lowermost casing section 520 which is secured to the base 1, the uppermost casing section 521, which is secured to the seat supporting cross-head 105 and the intermediate relatively telescopic sections 522 and 523.

Said lowermost casing section 520 is formed of complementary substantially counterpart half sections 525 and 526 joined along the vertical central longitudinal plane of the chair and affords a forwardly elongated pocket 527 which embraces the electric motor 250, and terminates upwardly in a cylindrical neck 530 whose upper edge margin is turned inwardly to provide the flange 531.

As best shown in Fig. 23, the half sections 525 and 526 of the lowermost casing section 520 are provided with the inwardly extended relatively spaced opposed lugs 535 and 536 which are arranged to embrace the anchor lug 537 which projects upwardly from the bearing block 25 and which is provided with a horizontally extended through bore 539, into which the relatively opposed dowel pins 540 and 541 projecting from the respective lugs 535 and 536 extend, to anchor the rear of the said casing section 520 to the chair frame supporting carriage 5.

Referring further to Fig. 23, the half sections 525 and 526 of the lowermost casing section 520 are provided intermediate of their forwardly extended plane walls with the inwardly projecting bosses 542 and 543 which respectively abut against the suitably provided plane surfaces 545 and 546 on the respective bearing blocks 26 and 27 to which the half sections 525 and 526 are respectively secured by the retaining screws 549 and 550.

In order to insure proper alinement of the forwardly extending downwardly curved upper walls of the half sections 525 and 526, said walls are respectively provided with the inwardly extending relatively opposed lugs 552 and 553, the lug 552 being provided with the dowel pin 555 which extends into the relatively alined aperture 556 in the lug 553 when the half sections are drawn together by the retaining screws 549 and 550.

Said half sections 525 and 526 are provided near their semicylindrical upper ends with the external encircling channel 557 arranged to receive the retaining band 559 preferably formed of a ribbon of suitable metal which may have its ends secured together in any suitable manner as by screws, and arranged to so bind said half sections together as to in effect provide an integral casing structure.

As shown in Figs. 4, 5 and 6, the uppermost casing section 521 is carried up and down by the seat supporting cross-head 105, and comprises a cylindrical shell having its lower end margin extended outwardly to provide the peripheral flange 560 which is adapted to support the subjacent uppermost intermediate casing section 522 in which it may reciprocate.

Said casing section 522 is provided with the angled annulus 561 which is secured to the upper end margin of the casing section 522 and which has its inturned horizontal flange 562 overlapping and resting upon the outwardly extended flange 560 of the casing section 521 when the chair seat supporting cross-head 105 is disposed in any raised position. The lower end margin of the casing section 522 is also extended outwardly to provide the peripheral flange 563 which is adapted to support the subjacent lowermost intermediate casing section 523 in which it is free to reciprocate.

The casing section 523 is provided with the angled annulus 565 which is secured to the upper end margin of said casing section 523 and which has the inturned horizontal flange 566 overlapping and resting upon the outwardly extended flange 563 of the casing section 522 when the chair seat supporting cross-head 105 is in raised position.

As illustrated in Fig. 6, the chair seat supporting cross-head 105 and associated mechanism is shown lowered to its minimum height position. In said figure the relatively collapsed position of the several casing sections is best indicated. In the descent of the relatively movable chair parts, the lowermost intermediate casing section 523 descends in telescoped relation into the neck 530 of the lowermost casing section 520 until its annulus 565 rests upon the inturned flange 531 upon which it is supported until the chair seat is again raised.

In the further descent, the uppermost intermediate casing section 522 descends in telescopic relation into the thus rendered immobile casing section 523 until its annulus 561 rests upon the inturned flange 566 of the annulus 565 and is thus rendered immobile while the uppermost casing section 521 telescopically descends therein until the chair parts reach their minimum lowering stroke.

As illustrated in Fig. 24, the uppermost casing section 521 is provided with the vertically disposed guide cleats 569, 570 and 571, one of which is shown in perspective in Fig. 27, and each comprises the segmental outer wall 572 and the relatively spaced opposed inturned flanges 573 and 574, which, as illustrated in Figs. 25, 26 and 29 may be removably and replaceably engaged beneath the heads 575 of the rivets 576 which project radially from the several cylindrical casing sections.

With further reference to Fig. 24, the guides 569, 570 and 571 respectively slide up and down in suitably provided segmental recesses 579, 580 and 581 disposed in the inner periphery of the flange 562 of the annulus 561. Similarly, guide cleats 589, 590 and 591 are provided on the uppermost intermediate casing section 522 which slide up and down in the segmental recesses 592, 593 and 594 in the inner periphery of the flange 566 of the annulus 565. Also, guide cleats 599, 600 and 601 are provided on the lowermost intermediate casing section 523, which slide up and down in the segmental recesses 602, 603 and 604 in the inner periphery of the flange 531 of the lowermost casing section 520. Thus, it will be obvious from the foregoing that all of the casing sections will be maintained in proper alinement in any relative vertically disposed positions that they may occupy.

As shown in Figs. 1, 2, 6 and 24, the lower edge of rear and sides of the lowermost casing section is provided with a kick plate or shield 605 which prevents marring of the casing by the operator's foot in operating the controlling pedals 362 and 367 and the brake pedal 422, and said shield also serves for ornamentation.

My invention is advantageous in that the operating parts of the chair are so arranged as to insure simple and efficient actuation, and are so associated as to be readily accessible by the mere removal of the two half sections 525 and 526 of the casing, each of which is retained in operative

position to envelop the operative mechanism by but a single screw.

I do not desire to limit my invention to the precise details of construction and arrangement as herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

Having thus described my invention, I claim:

1. In an adjustable chair, the combination with a base, of a carriage rotatable on said base, a seat supporting pedestal comprising a plurality of relatively extensible seat supporting sections, mechanism arranged to relatively extend said pedestal and to raise the chair seat, releasing means arranged to cause said seat to descend, a trip lever arranged to effect actuation of said mechanism and releasing means, a controlling foot pedal mounted to oscillate on a vertical axis and having an extended prong, opposed jaws pivoted on said axis and yieldingly drawn into contact with said prong, a stop limiting the relative approaching movement of said jaws and by which said pedal is normally maintained in its neutral position, a pair of relatively crossed levers also pivoted on said axis and having opposed beaks yieldingly engaged with said prong and arranged to be rocked thereby and having their respective opposite ends arranged to rock said trip lever in accordance with the movement of said pedal.

2. In an adjustable chair, the combination with a base, of a seat supporting pedestal comprising relatively extensible and retractable seat supporting sections, mechanism arranged to effect extension of said sections, means arranged to effect retraction of said sections, a trip lever arranged to rock in one direction to actuate said mechanism and to rock in the opposite direction to actuate said means, a foot pedal mounted to oscillate on a vertical axis and having a prong, means arranged to yieldingly maintain said pedal in neutral position, and a pair of relatively crossed levers also pivoted on said axis and having their forwardly extended ends disposed upon opposite sides of said prong, and their rearwardly extending ends disposed on opposite sides of the free end of said trip lever, and yielding means tending to draw the ends of the respective crossed levers together.

3. An adjustable chair comprising a base, an extensible seat supporting pedestal formed of relatively movable sections, means arranged to move said sections vertically with respect to each other, a seat mounting carried by said pedestal, a seat supported on said mounting, a casing arranged to envelop the pedestal sections and comprising a plurality of relatively telescopic sections providing an extensible and retractable enclosure for said pedestal and its associated operative mechanism, and means including vertically extending cleats and complementary cooperative recesses on the adjacent telescopic sections arranged to prevent their relative rotation.

4. An adjustable chair comprising a base, an extensible seat supporting pedestal formed of relatively movable sections, means arranged to move said sections vertically with respect to each other, a seat mounting carried by said pedestal, a seat supported on said mounting, a casing arranged to envelop the pedestal sections and comprising a plurality of relatively telescopic sections providing an extensible and retractable enclosure for said pedestal and its associated operative mechanism, and means including vertically extending cleats and complementary cooperative recesses on the adjacent telescopic sections arranged to prevent their relative rotation, said cleats being yieldingly engaged with the heads of suitably provided rivets projecting radially from said sections.

5. An adjustable chair comprising a base, a seat support, relatively movable telescopic pedestal sections arranged to effect movement of said seat support up and down, rollers serving as the sole means for lineally guiding said pedestal sections, shafts for said rollers having an eccentric mounting upon which said rollers rotate and having serrations, and locking means arranged to engage said serrations to retain said shafts in their adjusted position.

6. In an adjustable chair, the combination with a stationary base, of a carriage rotatably mounted thereon and having upwardly extending walls forming a fluid reservoir, a frame pedestal section mounted on the walls of said carriage and removably secured thereto by means accessible from above said carriage, a sleeve section mounted for vertical movement within said pedestal section, a readily accessible cylinder secured at its top to said sleeve section and depending exterior thereto into said pedestal section, a cooperative piston having a tubular rod extending into said reservoir and suspended from said pedestal section, means arranged to force fluid into said cylinder through said rod and piston, means arranged to release said fluid, a seat supporting shaft mounted for vertical movement in said sleeve section, and a single endless chain extended within and without said sleeve section and arranged to travel around sprockets carried by said sleeve section, said chain being attached to said pedestal section and to said seat supporting shaft and approximating axial coincidence with said relatively movable elements.

7. In an adjustable chair, the combination with a base of a seat supporting pedestal comprising a plurality of readily extensible seat supporting sections, means connected to raise and lower said sections, a power unit comprising a combined motor and pump arranged to effect movement of said sections, and a yoke embracing said unit and having independent relatively spaced resilient mountings by which said unit is floatingly cradled.

8. An adjustable chair comprising a base, a seat support, a carriage for said seat support rotatable on said base, a seat supporting pedestal mounted on said carriage and comprising a frame section, a sleeve section arranged to move vertically therein, and a seat supporting shaft being connected to move up and down with respect to said sleeve section, and cooperative cylinder and piston means disposed exterior to said sleeve and directly attached thereto arranged to effect its movement up and down, and means comprising sprocket and chain connection between said sleeve section and seat supporting shaft arranged to effect relatively accelerated movement of said seat supporting shaft.

9. In an adjustable chair, the combination with a base, of a relatively moveable seat support, a carriage for said seat support rotatable on said base and having a fluid reservoir formed in unitary relation therewith, a pedestal frame section mounted on said carriage and removable as a unit therefrom, oppositely disposed vertically alined rollers mounted to rotate in said frame section, a pedestal sleeve section arranged to move up and down in said frame section and guided solely by said rollers, oppositely disposed

vertically alined rollers mounted to rotate in said sleeve section a vertically disposed seat supporting shaft guided solely by the sleeve mounted rollers, means arranged to move said sleeve section up and down, and means connecting said frame section, sleeve section and shaft whereby lineal movement of said sleeve section with respect to said frame section effects lineal movement of said shaft and seat support.

10. In an adjustable chair, the combination with a base, of a carriage rotatably mounted on said base and having upwardly projecting walls providing a fluid reservoir, a seat carrying assembly supported on said carriage and comprising a relatively telescoped pedestal frame section, a pedestal sleeve section and a seat supporting shaft all removable from said carriage as a unit to afford free access to said reservoir while it is normally supported on said base, means arranged to move said sleeve sections up and down, relatively spaced vertically alined sprocket wheels carried by said sleeve section, and a chain attached to said frame section passing around said sprocket wheels and extended within and without the wall of said sleeve and having its opposed ends connected for linear adjustment and having an intermediate region engaged with said shaft and approximating axial coincidence with the seat supporting shaft whereby lineal movement of said sleeve section effects relatively accelerated movement of said shaft and its supported seat.

11. In an adjustable chair, the combination with a base, of a carriage rotatably mounted on said base and having upwardly projecting walls providing a reservoir unitary therewith, seat supporting mechanism cooperative to elevate and lower said seat and comprising a pedestal frame section, detachably supported on said upwardly projecting reservoir walls, a pedestal sleeve section and a seat supporting shaft, all removable as a unit from said carriage and its reservoir thus affording free access thereto, means arranged to move said sleeve section up and down, relatively spaced vertically alined sprockets rotatably mounted on said sleeve section, and a closed chain carried by said sprockets and embracing the wall of said sleeve whereby it approximates the axis of the seat supporting shaft, and has relatively spaced regions engaged with said pedestal frame section and with said seat supporting shaft, so that when said pedestal sleeve section is lineally moved, an accelerated axial movement of the seat supporting shaft is produced.

ROBERT C. ANGELL.

CERTIFICATE OF CORRECTION.

Patent No. 2,352,678. July 4, 1944.

ROBERT C. ANGELL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 9, first column, line 7, for "inven-" read --invention as defined in the appended claims.--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in Patent Office.

Signed and sealed this 22nd day of August, A. D. 1944.

Leslie Frazer

(Seal) Acting Commissioner of Patents.