

June 2, 1964

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3,135,550

ADJUSTABLE CHAIR FOR PROFESSIONAL PURPOSES

Filed Nov. 29, 1961

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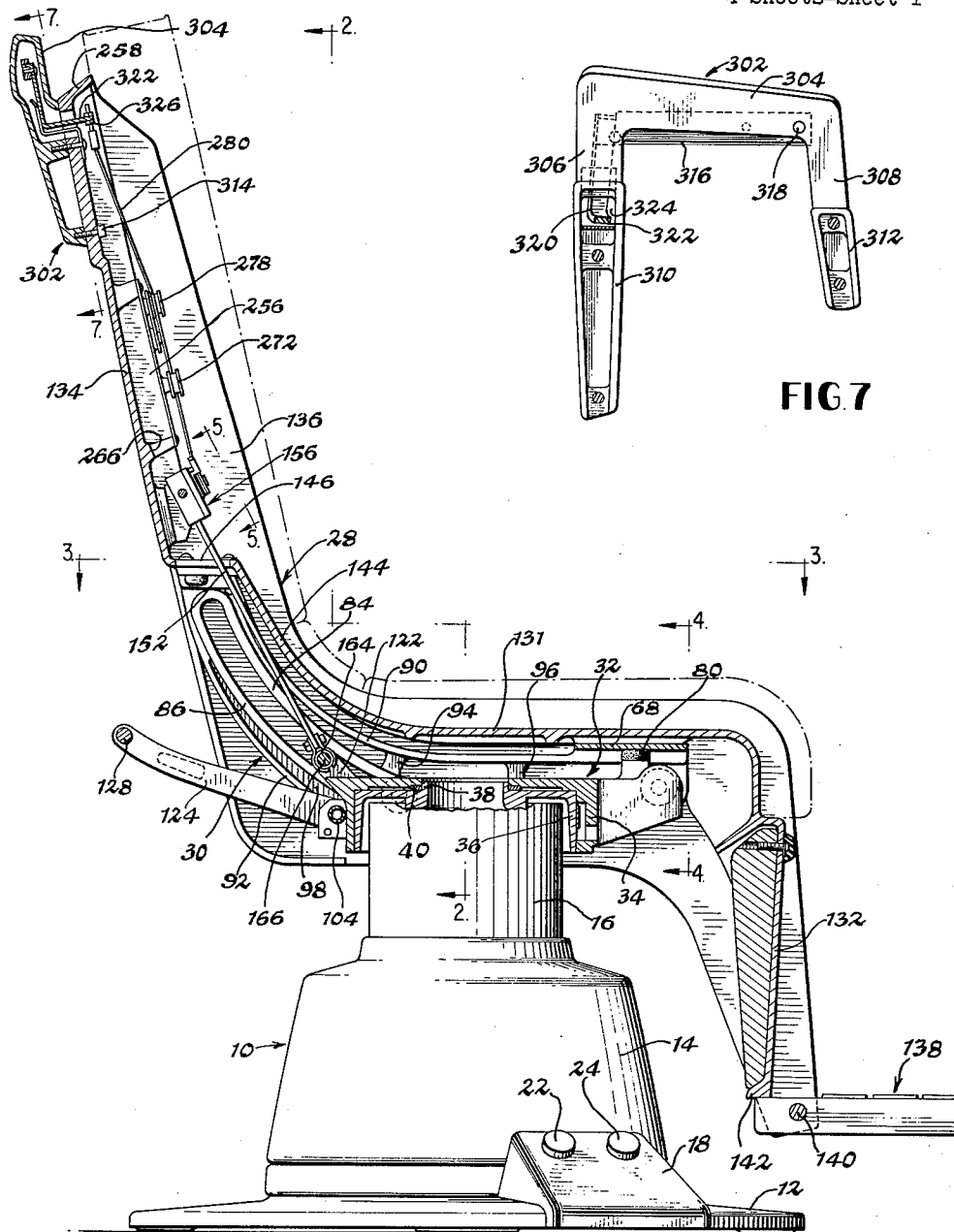


FIG 1

FIG 7

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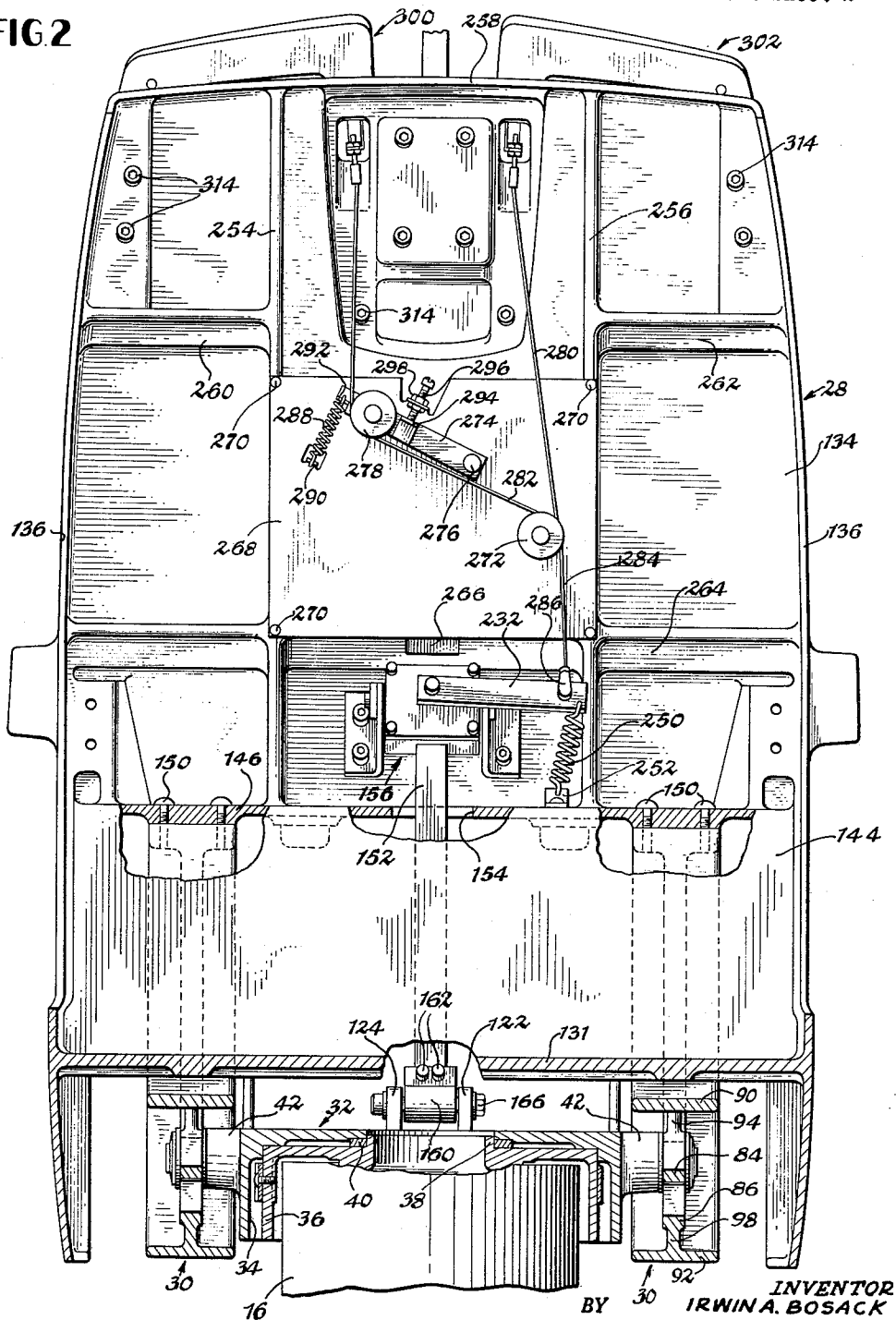
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FIG 2



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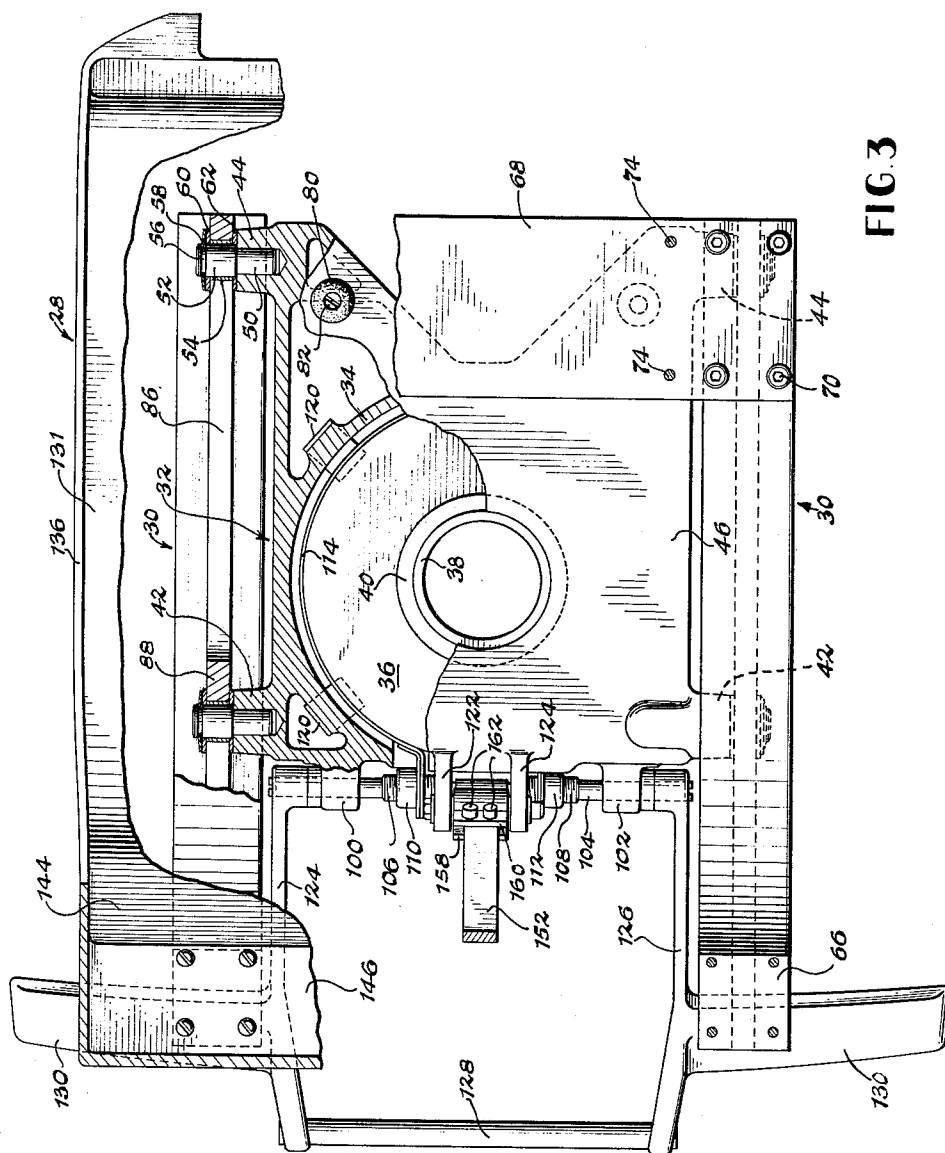


FIG. 3

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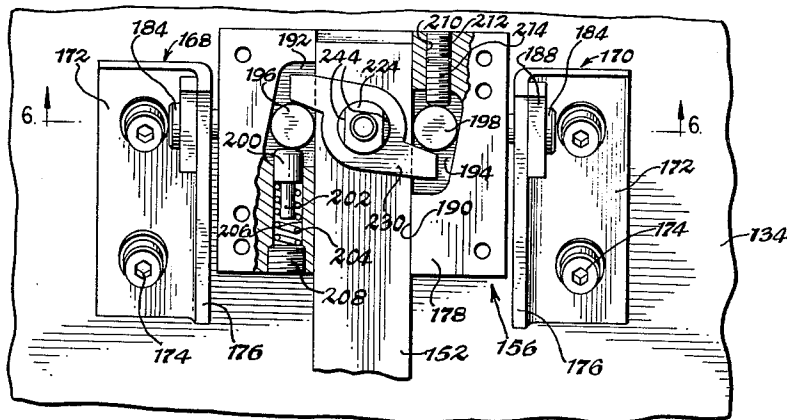


FIG 5

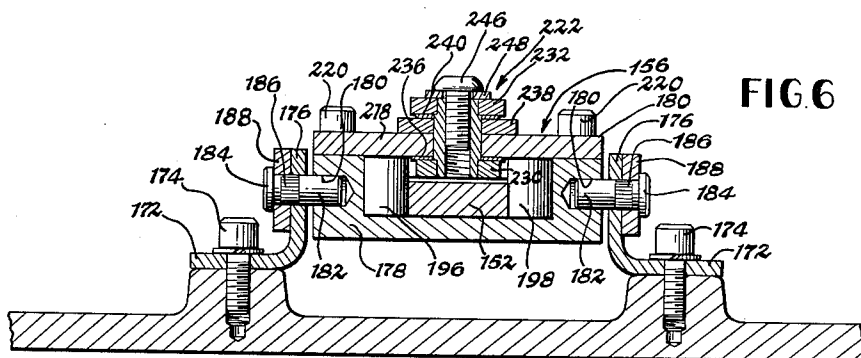
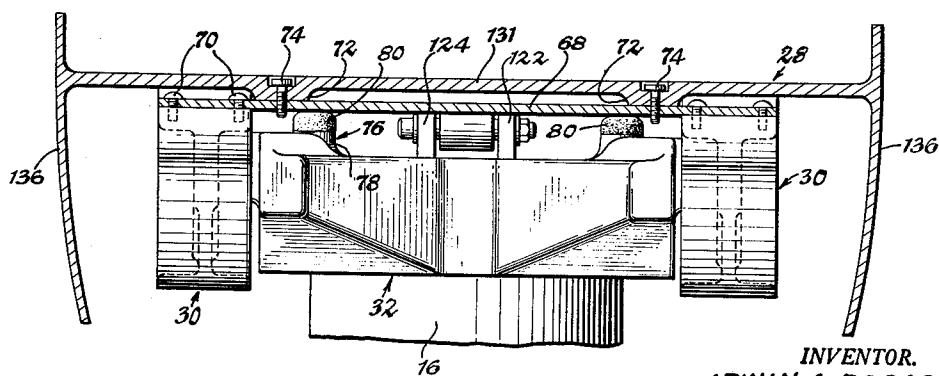


FIG 6

FIG 4



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3,135,550 ADJUSTABLE CHAIR FOR PROFESSIONAL PURPOSES

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6 Claims. (Cl. 297—329)

This invention relates in general to chair mechanisms and pertains more particularly to that type of chair especially adapted for the purpose of ophthalmic or dental use, for example.

It is of primary concern in connection with the present invention to provide an improved form of swivelable and tilting chair assemblage particularly adapted for the purposes intended in which the features of construction thereof are such as to produce an extremely rugged and efficient chair device which, at the same time, is characterized by its relative simplicity of construction, obviating the necessity for a plethora of component parts to achieve the objectives desired. In this connection, it is to be noted that patient's chairs, as for example ophthalmic or dental chairs, require to be substantially rugged so that they may have a long life expectancy while, at the same time, they should be maintained at sufficiently low cost as to render them practicable. To further these ends, the chair should be composed of a minimum number of component parts and should, in general, be of relative simplicity so that the same will be relatively trouble free and will otherwise continue to give good service over an extended period of time.

In essence, the present invention is directed to a mechanism as aforesaid including a base mounted guide assembly which is adapted for rotary movement about a vertical axis, the guide assembly being engaged by trackway members carried by a chair frame and by means of which the chair frame is tiltable along, preferably, a generally arcuate path, the chair frame being constructed for maximum efficiency and for permitting a relatively simple brake mechanism to be utilized in conjunction with the tilting mechanism so as to arrest the motion of the chair and position the same as desired, the several component parts of the assemblage being all so interrelated and cooperatively disposed as to minimize complexity while at the same time achieving a maximum of efficiency for the purposes intended.

Other objects and advantages of the invention will appear from the description hereinbelow and the accompanying drawings wherein:

FIG. 1 is a side elevational view of the supporting base structure, portions thereof being broken away for clarity and illustrating the chair frame and guide assembly in section;

FIG. 2 is a vertical section taken substantially along the plane of section line 2—2 in FIG. 1 showing details of the chair frame as well as of the trackway and guide members and illustrating in part the brake mechanism for the tilting device;

FIG. 3 is a horizontal section taken substantially along the plane of section line 3—3 in FIG. 1 showing details of the brake mechanism, the guide assembly and of the chair frame;

FIG. 4 is an enlarged vertical section taken substantially along the plane of section line 4—4 in FIG. 1 showing details of the guide assembly, the trackway members and portions of the chair frame;

FIG. 5 is an enlarged elevational view, partly broken away as indicated by section line 5—5 in FIG. 1 and showing details of a brake mechanism;

FIG. 6 is a horizontal section taken substantially along the plane of section line 6—6 in FIG. 5 illustrating further details of the brake mechanism; and

FIG. 7 is an elevational view taken along the plane

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of section line 7—7 in FIG. 1 illustrating one of the hand grip and brake release mechanisms.

Referring now more particularly to FIG. 1, the chair assembly as shown therein includes a supporting base assembly indicated generally by the reference character 10, the details of which form per se no part of the present invention save for the combinational aspect relative thereto. By way of explanation, however, the base assembly 10 includes the foot plate 12, the main body portion 14 and the elevating post assembly 16, the latter of which contains a series of telescopically engaged post members which are for the purpose of raising and lowering the entire chair structure hereinafter described. For control of this elevating assembly, the base 10 is provided with a switch mechanism 18 having foot switches 20 and 22 for respectively raising and lowering the assemblage. In passing, it may be noted that it is preferred that the mechanism for raising and lowering the chair assembly be of hydraulic type so as to obtain a smooth and nicely controllable raising and lowering action.

The chair proper includes a frame indicated generally by the reference character 26 in FIG. 1 and the details of which will be hereinafter more particularly pointed out. Associated directly with the chair frame 28 are a pair of trackway members, one of which is indicated by the reference character 30 in FIG. 1 and these trackway members in turn are cooperatively associated with a guide assembly indicated generally by the reference character 32. The guide assembly 32 preferably consists of a one piece casting or the like and is provided with an annular depending skirt portion 34 which receives a hub member 36 in nested relation therewithin, the hub 36 forming a part of the elevating post assembly. The hub 36 is provided with an upraised boss portion 38 which locates a thrust collar or bearing 40 interposed between the guide assembly 32 and the hub 36 so as to readily permit of rotation therebetween about a substantially vertical axis.

As can be seen best in FIG. 3, the guide assembly 32 is provided along each side thereof with a pair of outstanding lugs 42 and 44 and the upper surface thereof is preferably substantially solid as is indicated by the reference character 46. Each of these lugs 42 and 44 is provided with a laterally inwardly directed bore for receiving the reduced end portion 50 of a roller post whose outer portion 52 is enlarged to receive a bushing 54 thereon and whose outer extremity is provided with an annular recess 56 for receiving a circlip or other suitable retaining member 58 substantially as is shown for the lug 44 in FIG. 3. The bushing 54 is disposed between a pair of thrust washers 60 and 62, the entire assemblage being maintained in operative relationship by the aforementioned circlip or retaining member 58, which, in the specific case shown, is of the Bellville spring type to impose some end loading on the various bushings and thrust washer members.

The support members or rollers as described above are guidedly received in the trackway members 30. Each trackway member is of generally arcuate shape longitudinally and extends fore and aft relative to the chair frame 28. The aft portion of each member 30 is formed as a pedestal as indicated by reference character 66 in FIG. 3 and the forward ends of these two members 30 are interconnected at their forward pedestal portions by the tie plate member 68. The tie plate is rigidly affixed at its opposite ends to the two trackway members 30 as by means of fasteners 70 as shown in FIG. 3 for example and intermediate of its ends, the tie plate is rigidly affixed to the under surface of the chair frame 28, as for example is shown in FIG. 4. For this purpose, the chair frame 28 is preferably provided with depending boss portions 72

which are recessed in their upper surface to receive the fasteners 74 substantially as is shown. Underlying the tie plate 68 in the regions thereof adjacent the bosses 72 are bumpers 76 which are mounted directly upon the guide assembly 32 as can be seen best in FIGS. 3 and 4. For this purpose, the guide assembly 32 is provided with upstanding bosses 78 which mount resilient cushioning members 80 thereon as by fasteners 82. The purpose of this construction will be more readily apparent hereinafter.

Each of the track members 30 is provided with a pair of transversely projecting and longitudinally extending spaced webs such as those indicated by reference characters 84 and 86 in FIG. 1 and which may be joined intermediate their ends by a web piece 88 as is shown in FIG. 3. These two flanges 84 and 86 form the trackway for the roller assemblies previously described and, specifically, are engaged by the bushings 54, the diameter of the bushing being slightly less than the spacing between the flanges 84 and 86. For the purpose of rigidity, each trackway member 30 is also provided with upper and lower flange portions 90 and 92, the former of which are interconnected at their ends solidly with the body of each trackway and which are interconnected intermediate their ends by web pieces 94 and 96 to the upper trackway flange 84. The latter of these flanges 92 is preferably interconnected to the lower flange 86 by means of a solid web 98 although it is to be understood that the specific construction herein described need not be rigidly followed so long as the principles of operation remain the same.

To complete the description of the guide assembly 32, reference is had to FIG. 3 wherein it will be seen that such assembly is provided with a pair of rearwardly projecting ears 100 and 102 which rotatably mount a shaft element 104 substantially as is shown. The shaft 104 is provided with a pair of threaded portions 106 and 108 of which the portion 108 is provided with right-hand threads and the portion 106 with left-hand threads. A pair of nut members 110 and 112 are received on these threaded portions of the shaft 104 and each is connected to a corresponding end portion of a brake band 114 which encompasses the hub 36 substantially as is shown. In this fashion, it will be manifest that rotation of the shaft 104 in counterclockwise fashion as is viewed in FIG. 1 will cause the two non-rotatable nut members 110 and 112 to feed inwardly towards each other and thus tighten the brake band 114 so that the entire chair assembly may be prevented from swivelling about the vertical axis hereinbefore mentioned.

The guide assembly may also include L-shaped retaining brackets 120 as shown in FIG. 3 which have horizontally inwardly directed lower leg portions which extend below the lower edge of the hub 36 for the purpose of preventing accidental disengagement of the chair structure together with the guide assembly 32 from the support post assembly 16. The guide assembly 32 is, lastly, provided with a further pair of rearwardly projecting ears 122 and 124, the purpose of which will be presently apparent.

For the purpose of operating the shaft 104, the opposite ends of the same are rigidly affixed to the forward ends of arms 124 and 126, which arms project rearwardly of the shaft structure and are rigidly interconnected by a cross bar 128, each arm 124 and 126 being provided adjacent its rearward extremity with laterally projecting treadle portions 130 substantially as is shown. The treadle portions 130 and the bar 128 are adapted to be engaged preferably by the doctor's knee for releasing the swivel brake mechanism as aforementioned, the vertical disposition of these members being more readily apparent in FIG. 1.

The seat frame 28 includes a seat cushion support portion 131, a depending front apron portion 132 and an upwardly inclined back portion 134. Reinforcing the various parts throughout the length thereof and also serving as retaining means for seat cushions which are indicated

by the dotted lines in FIG. 1, are opposite side wall members 136, the lower extremities of which pivotally mount a foot platform portion 138 as by means of the pivot shaft 140. The platform 138 may be constructed as desired and is preferably provided with means such as the abutment 142 to retain the same normally in a generally perpendicular position relative to the apron portion 132 or at such other angle as provides a maximum comfort for the patient disposed in the chair assembly. It will be noted that the arcuate portion 144 of the seat part 131 terminates along its upper edge in forwardly offset relationship to the lower edge of the back portion 134, these two edges being joined by a generally horizontal shelf portion 146, see particularly FIGS. 2 and 3. The relative disposition of the portions 144 and 134 at once provides ready means for attaching the rearward ends of the tracks 30 to the under surface thereof, as by fasteners 150 as shown in FIG. 2 and also provides means for clearing the brake bar 152 which can be best seen in FIGS. 1 and 2. The shelf 146 is provided with an opening 154 for clearing the bar 152 through which the same projects for engagement with the brake assembly indicated generally by the reference character 156. The lower end of the bar 152 is provided with a pair of clamping brackets 158 and 160 which are secured to the bar by fasteners 162 which also serve to urge the brackets together into clamping relationship with a bushing member 164, see particularly FIG. 1. This bushing, in turn, is rotatably mounted on a pin bolt 166 carried by the brackets 122 and 124 previously described.

As can be best seen in FIGS. 5 and 6, the assembly 156 is mounted on the back portion 134 of the chair frame by means of a pair of brackets 168 and 170, each of which is of generally L-shape configuration having a mounting leg portion 172 affixed to the chair frame as by fasteners 174 and each of which is provided with an outstanding leg portion 176, the assembly 156 being pivotally mounted between the legs 176. The brake assembly includes a main body portion or block 178 provided on opposite sides thereof with recesses 180 pivotally receiving the inner journalled ends 182 of a pair of fasteners 184 substantially as is shown in FIG. 6. The members 184 are provided with nut portions 186 by means of which they are staked in place within the legs 176, there being provision for means for removing the members 184 if so desired, taking the form of nut members 188 also staked rigidly thereto and permitting the members to be rotated so as to loosen the same in the legs 176 if removal of the members 184 becomes desirable.

As can be seen best in FIG. 5, the body or block 178 is provided with a slot 190 therethrough as well as oppositely disposed taper recesses 192 and 194 which intersect with the slotway 190 substantially as is shown and each of which is provided with a roller member 196 or 198 cooperatively associated therewith and with the tapering surfaces thereof as is shown in FIG. 5 to provide a locking action of the bar 152. Since the recess 192 tapers in an upward direction, some means is required to bind the cylinder 196 against the bar 152 against the action of gravity whereas the roller 198 will naturally seek such binding action under the influence of its own weight. For the roller 196, a suitable plunger 200 is provided having a reduced stem portion 202 receiving one end of a compression spring 204 and the whole assembly being slidably received in a bore 206 in the block 178. A threaded counterbore portion is provided and a threaded element 208 is received therein for providing a seat for the spring 204 therefore adjusting the spring to engage the cylinder 196 in binding relationship to the bar 152. A threaded bore 210 is provided in conjunction with the recess 194 and a pair of threaded members 212 and 214 are engaged therein, the outer member 212 serving to hold the adjustment of the inner member 214 so that the roller or cylinder 198 is permitted of very little motion in the unlocking direction so as to obtain a

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rapid and secure locking action. It will thus be apparent that the two recesses 192 and 194 and their associated rollers 196 and 198 are so disposed as to prevent, normally, movement of the bar 152 in either direction, the roller 196 preventing movement of the bar 152 upwardly in FIG. 5 and the roller 198 preventing movement of the bar 152 downwardly in FIG. 5. Preferably, the aforementioned slot 190 and the recesses 192 and 194 are such as to leave one side of the block 178 opened, and in order to make a closed assembly, the cover plate 218 is provided, secured to the block 178 are the fasteners 220 substantially as is shown in FIG. 6. This cover plate also serves to mount the relief mechanism 222 for the brake assembly.

This relief assembly may take the form of an internally threaded spool or bushing 224 whose opposite ends are provided with diametrically opposed flats or are otherwise provided to be noncircular in cross section for receiving corresponding apertures in the cam member 230 and the actuating lever 232 respectively. The cam 230 is rigidly affixed to the lower end of the sleeve 224 and a thrust washer 236 is disposed between this cam and the under surface of the cover 218 whereas a spacer 238 and a thrust washer 240 are disposed between the outer surface of the cover 218 and the actuating arm 232. The actuating arm 232 is engaged on the flats 244 at the upper extremity of the sleeve 224 and the retaining bolt 246 and associated lock washer 248 are utilized for the purpose of maintaining the actuating arm in position affixed to the sleeve 224. As hereinafter described, the actuating arm is provided with means for moving the same whereby to oscillate the cam member 230 so that its oppositely directed wing will operate the cylinders 196 and 198 to release their braking action on the bar 152 when desired. Normally, however, the actuating arm is urged to an inoperative position by means of the tension spring 250, see particularly FIG. 2, which is attached to one end thereof and which is provided at its opposite end with an anchoring bracket 252 engaged on the shelf 146 substantially as is shown. It will be understood that a suitable cover plate (not shown) will be used to prevent interference with the operation of the various cables 282, pulleys 272, 278 and 232.

From the above relationship, it will be manifest that when the brake mechanism 156 is released, the chair frame 28 may be tilted relative to the base to a desired intermediate position at which time the brake mechanism may be released to hold such adjusted position. Thus, independent action of mechanism hereinafter described for operating the brake mechanism may be employed to tilt the chair while the treadle mechanism hereinbefore described may be operatively actuated to permit the swivelling motion of the chair.

Referring now more particularly to FIG. 2, it will be seen that the chair frame assembly 28 is substantially reinforced by the provision of a pair of vertically extending ribs 254 and 256 which extend from the upper wall 258 which bridges between the side walls 136 downwardly to the shelf 146. Additionally, a pair of horizontal webs 260, 262 extend between the ribs 254 and 256 and the adjacent side walls 136. A further rib 264 extends between the opposite side walls 136, intersecting with the vertical webs 254 and 256 and such rib 254 being provided with a cutout portion 266 to clear the brake bar 152 previously described. A mounting plate 268 is secured between the ribs 254 and 256 as by fasteners 270 and serves to mount guide and slack takeup mechanism for the operating cables connected to the actuating arm 232. To this end, the plate 268 mounts a guide pulley 272 and a slack takeup arm 274 pivotally mounted as at 276, the free end of which carries a further pulley 278 substantially as is shown. The two actuating cables 280 and 282 are joined adjacent the guide plate 272 and extend therefrom in the portion 284 for connection, at 286 to the actuating lever 232, all as is

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shown in FIG. 2. The slack takeup arm 274 is normally biased to take up slack in the cable 282 under the action of the tension spring 288 secured at its opposite ends respectively to a struck out ear 290 on the plate 268 and a struck out ear 292 on the free end of the takeup arm 274. Further, the arm 274 is provided with a laterally projecting bracket gear 294 serving as an abutment for the stop screw 296 in turn locked to a struck out gear 298 on the plate 268. By the arrangement shown, slack in either one of the cables 280 or 282 will be automatically taken up by the spring 288 which will swing the stop 294 away from the screw 296 so that subsequently applied tension to the cables will first take up this spacing between the stop elements and as soon as they are engaged, further tension on the cable will actuate the arm 232 in opposition to the brake actuating mechanism. Two hand grip assemblies 300 and 302 are provided at the upper extremity of the frame 28 on the rearward side thereof serving the purpose of mounting means for actuating the cables 280 and 282 as aforesaid. Each of these hand grip members is of similar construction and may be formed in the manner shown in FIG. 7. In this figure, there is provided a hand grip member having a hand grip bar 304 and a pair of depending legs 306 and 308 at the opposite ends thereof. The two legs 306 and 308 terminate in forwardly facing foot portions 310 and 312 which are engaged against the back side of the frame 28 and are secured thereto as by fasteners 314, see particularly FIG. 1. The hand grip portion 304 is hollow as is the leg 306, the former receiving a squeeze bar 316 pivotally mounted therein by the pin member 318 and the latter of which receives an L-shaped actuating member 320 whose forwardly projecting leg 322 extends through the opening 324 in the leg 306 and a corresponding opening in the chair back 134 for adjustable securement at its outer free end, at 326 to the upper end of a corresponding cable 280 or 282. Thus, squeezing on one of the bars 316 will operate the actuating bar 232 as aforesaid.

It is to be understood that certain changes and modifications as illustrated and described may be made without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A chair for ophthalmic examination and the like, comprising a supporting guide member having a pair of spaced, laterally projecting rollers at each side thereof, a chair frame having a back portion, a seat portion and a generally horizontal shelf portion joining the lower extremity of said back portion and the rearward extremity of said seat portion, a pair of arcuate trackway members having one end of each fixed to the underside of said shelf portion and the opposite end of each fixed to the underside of said seat portion adjacent the forward extremity thereof, said trackway members having arcuate tracks therein receiving said rollers, said shelf portion having an opening therein between said trackway members, a brake assembly mounted on a transverse horizontal pivot axis upon the forward side of said back portion above said opening in said shelf portion, a brake rod pivotally secured at its lower end to said guide member and extending through said shelf opening and said brake assembly to hold said chair frame in adjusted positions, and means mounted on the rear of said back portion for selectively releasing said brake assembly.

2. The chair according to claim 1 including a base, said guide member being rotatably mounted on said base, and brake means for selectively fixing said guide member to the base.

3. The chair according to claim 1 wherein a tie plate is secured between the forward ends of said trackway members, said seat portion being secured to said tie plate, and resilient bumpers mounted on said guide member for engaging the underside of said tie plate.

4. The chair according to claim 1 wherein said brake assembly includes a block having a slot and a pair of

oppositely tapered recesses intersecting said slot, said brake rod being received in said slot, a roller in each recess for wedging against said brake rod.

5. The chair according to claim 4 wherein said means for releasing the brake assembly includes a cam member for urging said rollers out of wedged relation with said brake rod, an actuating lever for operating said cam, and a cable element connected to said actuating lever.

6. The chair according to claim 5 wherein said chair frame is provided with a pair of hand grip members at the upper extremity of said back portion, said means for releasing said brake assembly including hand grip actuators carried by said hand grip members.

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