Feb. 2, 1926.

1,571,205

A. A. LAURENT

OPERATING TABLE

Filed Feb. 7, 1924

5 Sheets-Sheet 1

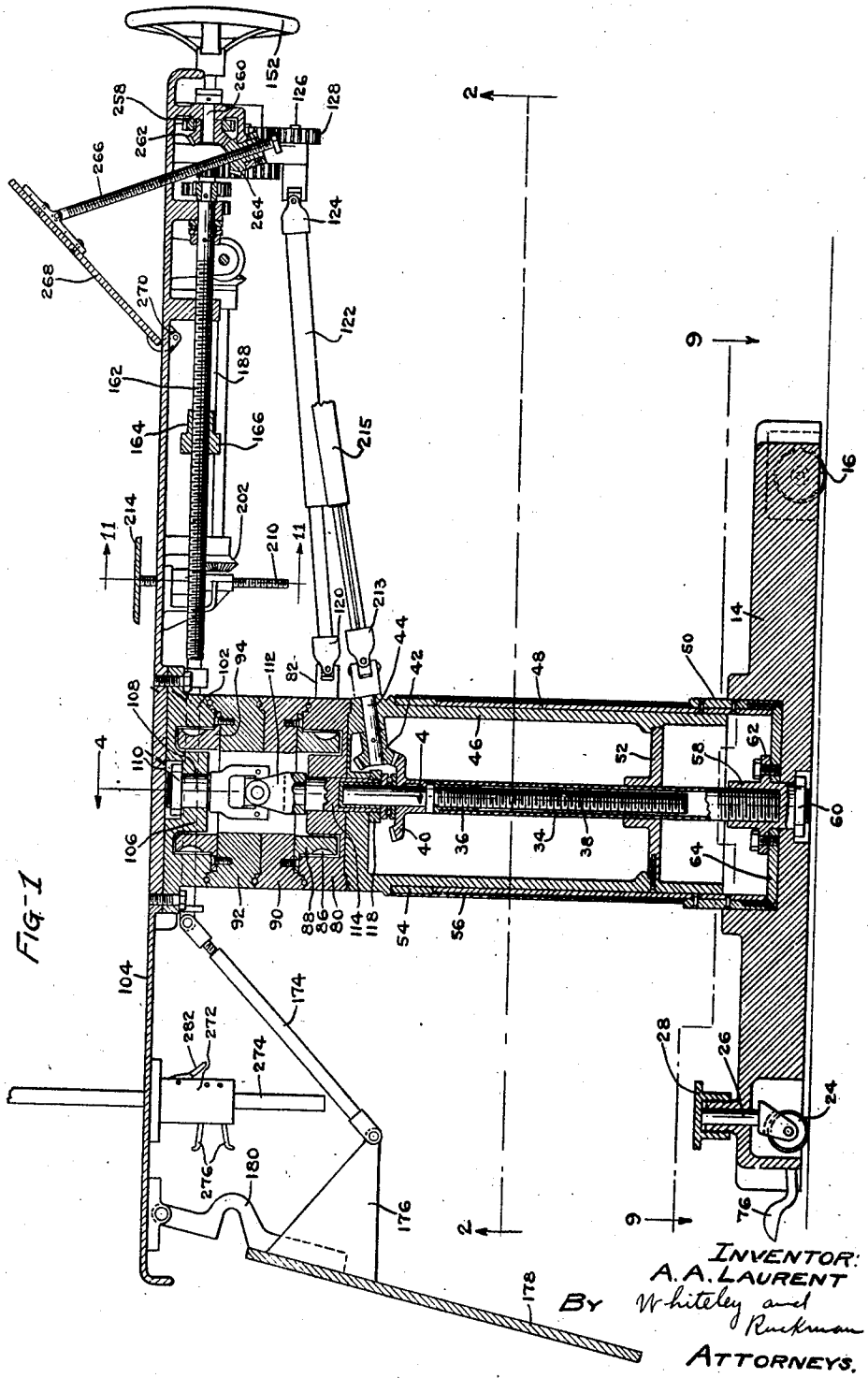


FIG. 1

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Feb. 2, 1926.

1,571,205

A. A. LAURENT

OPERATING TABLE

Filed Feb. 7, 1924

5 Sheets-Sheet 2

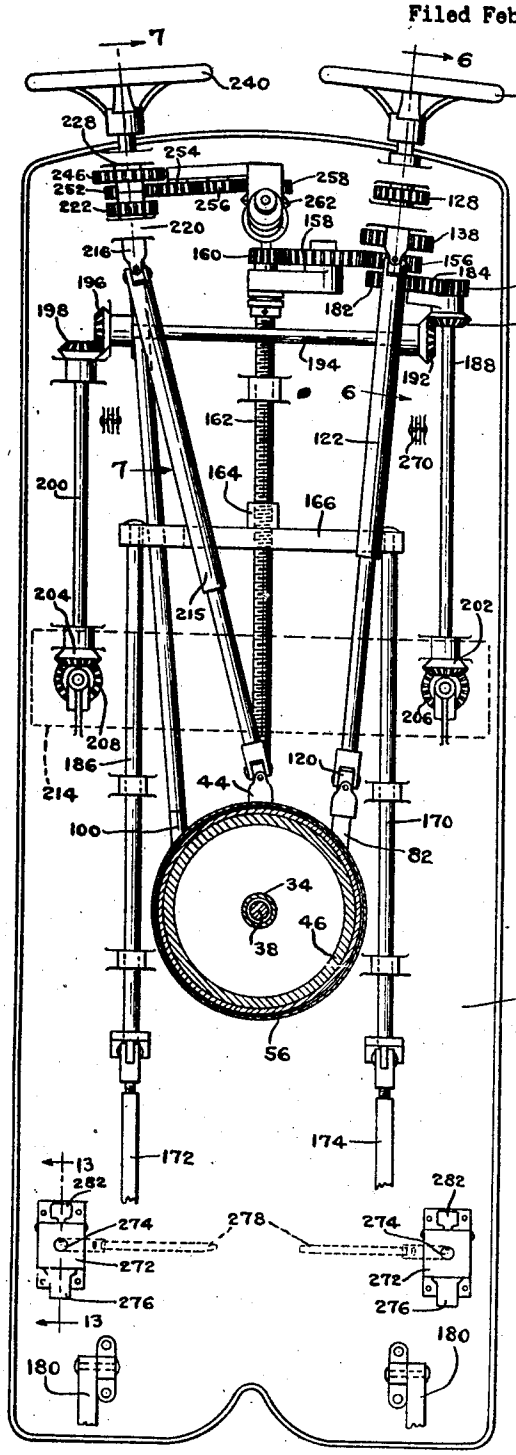


FIG-2

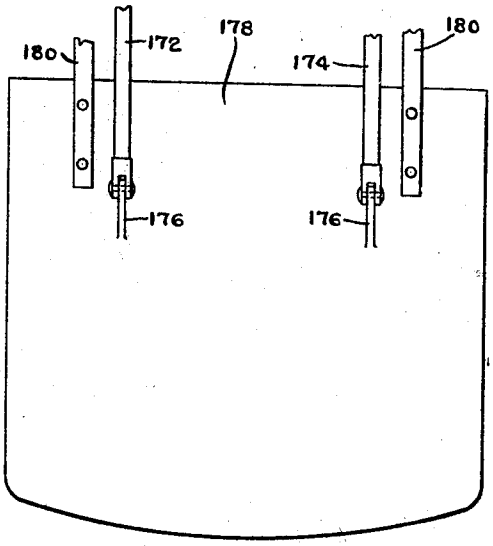


FIG-3

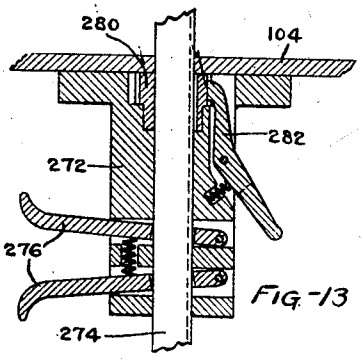


FIG-13

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Feb. 2, 1926. 1,571,205

A. A. LAURENT

OPERATING TABLE

Filed Feb. 7, 1924 5 Sheets-Sheet 3

FIG. 4.

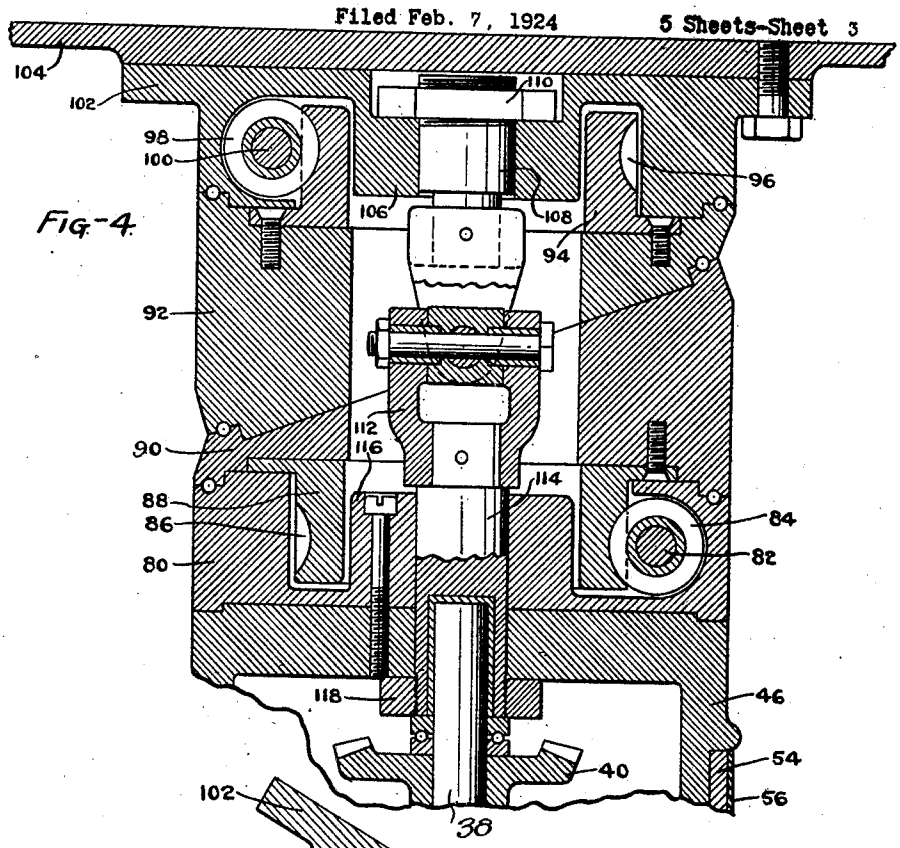
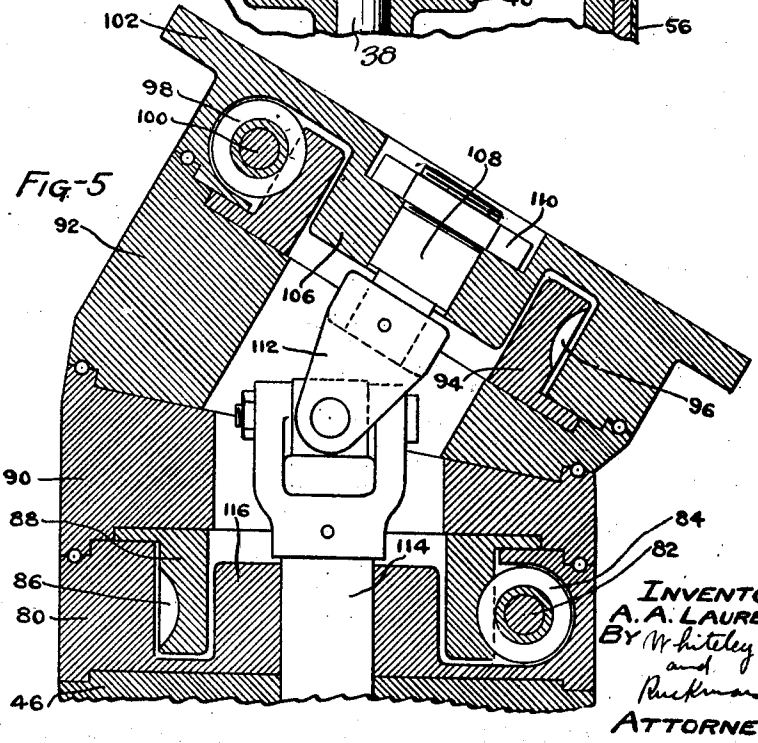


FIG. 5.



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A. A. LAURENT

OPERATING TABLE

Filed Feb. 7, 1924 5 Sheets-Sheet 4

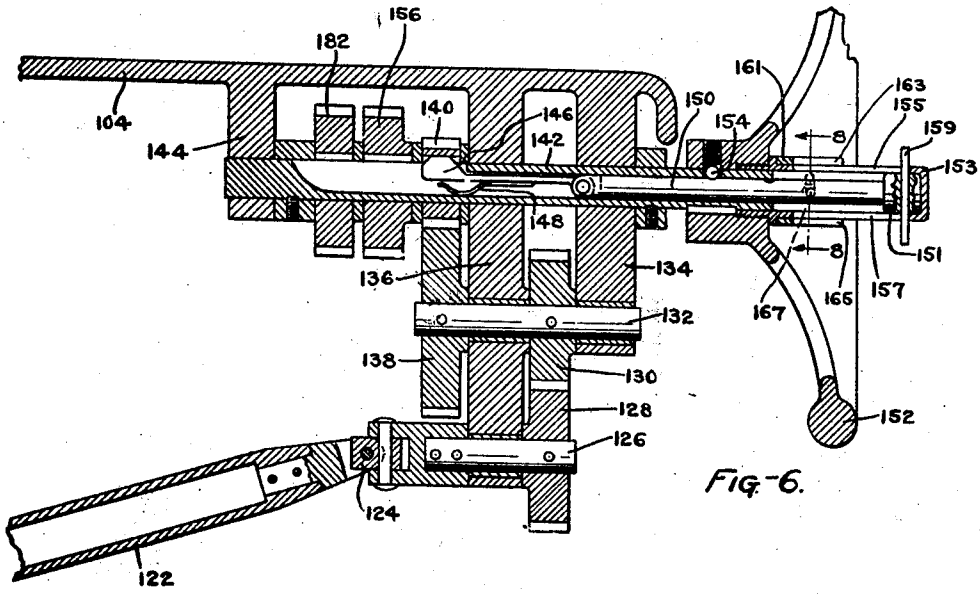


FIG-6.

FIG-7

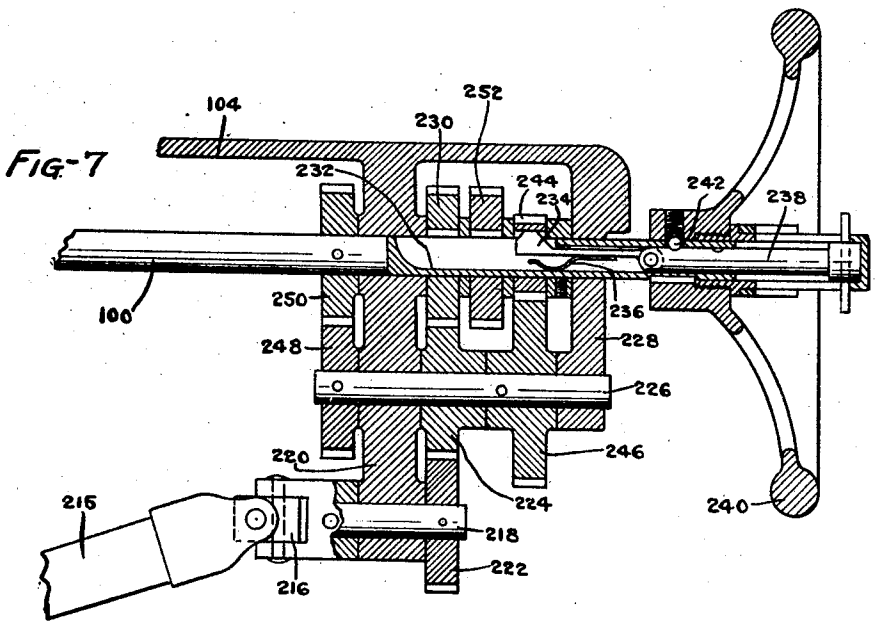
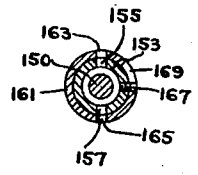


FIG-8



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Feb. 2, 1926. 1,571,205

A. A. LAURENT

OPERATING TABLE

Filed Feb. 7, 1924 5 Sheets-Sheet 5

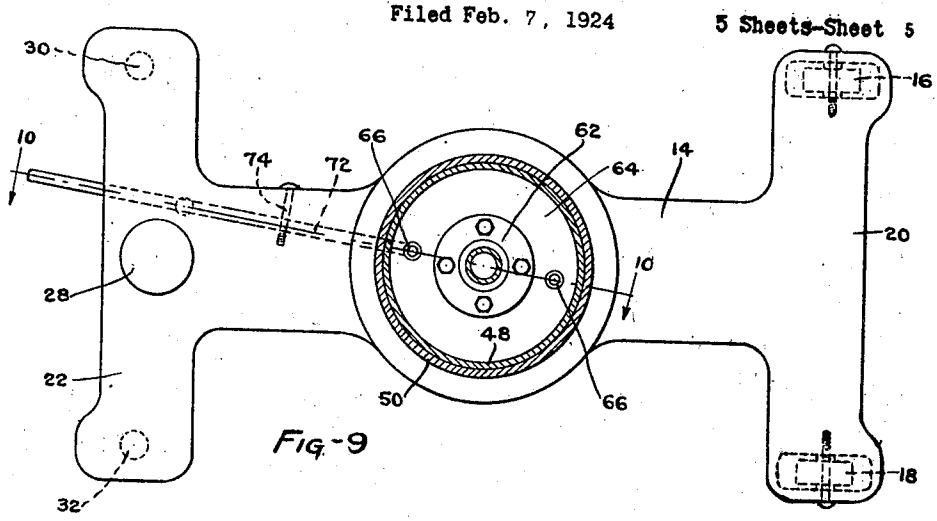


FIG-9

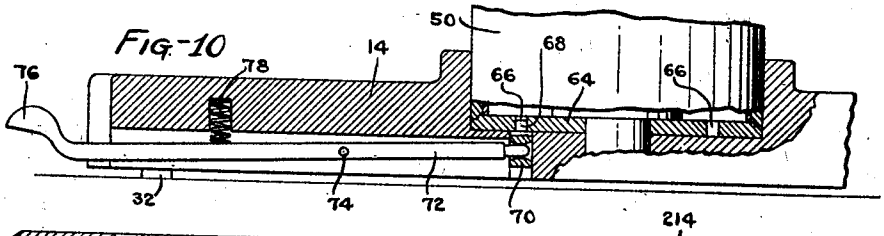


FIG-10

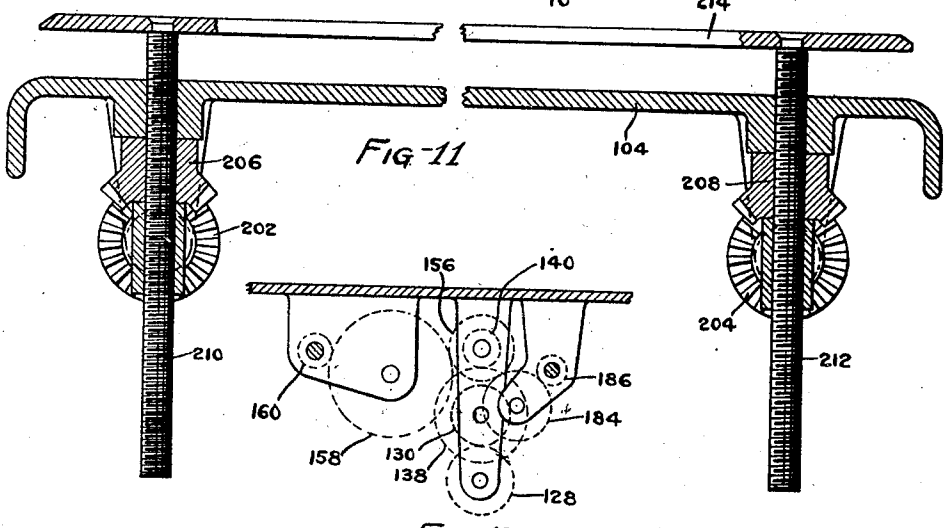


FIG-11

FIG-12

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Patented Feb. 2, 1926. 1,571,205

UNITED STATES PATENT OFFICE.

ANTOINE A. LAURENT, OF MINNEAPOLIS, MINNESOTA.

OPERATING TABLE.

Application filed February 7, 1924. Serial No. 691,137.

To all whom it may concern:

Be it known that I, ANTOINE A. LAURENT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Operating Tables, of which the following is a specification.

My invention relates to operating tables, and an object is to provide a device of this character for use by physicians and surgeons which is so constructed that a variety of adjustments can be readily made. An object in particular is to provide adjusting means which can be readily operated to tilt the table top or table proper out of a horizontal position in any direction through an entire circumference of 360°. Other objects are to provide means for adjusting a foot board, a head rest, and a kidney rest, and for raising and lowering the table.

The full objects and advantages of my invention will appear in connection with the detailed description, and the novel features of my inventive idea will be particularly pointed out in the claims.

The accompanying drawings which show a practical form in which my invention may be embodied, Fig. 1 is a view in central vertical section. Fig. 2 is a view in horizontal section on the line 2—2 of Fig. 1 looking in the direction of the arrows, and with the footboard removed. Fig. 3 is a bottom plan view of the foot board. Fig. 4 is a view in vertical section on the line 4—4 of Fig. 1. Fig. 5 is a view similar to Fig. 4 showing the table adjusted into a tilted position. Fig. 6 is a view in section on the line 6—6 of Fig. 2. Fig. 7 is a view in section on the line 7—7 of Fig. 2. Fig. 8 is a view in section on the line 8—8 of Fig. 6. Fig. 9 is a view in horizontal section on the line 9—9 of Fig. 1. Fig. 10 is a view in section on the line 10—10 of Fig. 9. Fig. 11 is a view in section on the line 11—11 of Fig. 1. Fig. 12 is a detail view of gearing which is employed. Fig. 13 is a detail view in section on the line 13—13 of Fig. 2.

Referring to the construction shown in the drawings, I provide a base member 14 having generally the shape of the letter I as shown in Fig. 9. One end of the base member is provided with two rollers 16 and 18 positioned at the end of the extended portion 20 while the other extended portion 22 of the base is provided with a centrally positioned caster 24 carried by a stem 26 fitting slidably in a socket the upper end of which is closed by a screw cap 28 which when partly unscrewed allows the caster to move up sufficiently so that rubber feet 30 and 32 carried by the member 22 rest upon the floor. Mounted centrally on the base is an upwardly extended tube 34 in the upper portion of which is a fixed nut 36 which receives the threads of a rod 38 which is screw-threaded for the greater portion of its length. The upper portion of this rod, however, is not threaded and has secured thereto a bevel gear 40 meshing with a bevel gear 42 secured to a shaft 44 adapted to be rotated in a manner hereinafter described for raising and lowering the table top. The upper end of the rod 38 fits rotatably in a socket carried by the upper end of a cylindrical member 46 in which the shaft 44 is rotatably mounted. The cylindrical member 46 fits slidably within a tube 48 which at its lower end is secured to a ringlike member 50 which in turn is secured to the base. Secured within the lower portion of the cylindrical member 46 is a plate 52 slidable upon the tube 34. A ring 54 is shrunk upon the upper portion of the member 46 and upon this ring is secured the upper end of a tube 56 which slidably engages the outer surface of the tube 48. The lower end of the tube 34 is screw-threaded into a socket member 58 which extends through an opening in the base and is provided with a nut 60 which firmly but rotatably holds the socket member in place. This socket member has an annular flange 62 which is secured to an annular disk 64 resting in a depressed portion of the base. The lower end of the ringlike member 50 is secured to the periphery of the disk 64 and this disk as shown in Figs. 9 and 10 is provided with holes 66 adapted to receive a pin 68 having a shank 70 mounted for vertical sliding movement and having a hole in which is received the inner end of a lever 72 contained in a slot in the base and mounted upon a pivot 74. The outer projecting end of the lever 72 is formed to constitute a handle 76 which, when pulled upwardly in opposition to the tension of a spring 78 causes the pin 88 to be retracted from the hole 66 so that the disk 64 is free to rotate and the table may then be turned end for end.

Secured upon the upper end of the cylindrical member 46 is a ring member 80 in the

wall of which is mounted a shaft 82 to which is secured a worm gear 84 located in a recess in the ring 80. This ring might be integral with the cylindrical member 46 but for convenience in manufacture is made separately and is bolted thereon. The gear 84 meshes with teeth 86 formed on the outer surface of an annular member 88 secured to the lower surface of a wedge-shaped ring 90 rotatably mounted upon the ring 80. The upper surface of the ring 90 is beveled and upon this beveled surface is rotatably mounted the corresponding beveled surface of a wedge-shaped ring 92 to the upper surface of which is secured an annular member 94, the outer surface of which is formed with teeth 96 with which meshes a worm gear 98 secured to a shaft 100 mounted on the wall of a ringlike member 102 which is recessed to receive the gear 98. The tabletop 104 is secured to the ring 102 which has an internally depressed annular flange 106 through which extends a rod 108 having a nut 110 on the upper end thereof. The lower end of the rod 108 is reduced and is connected by a universal coupling 112 of well known construction with the upper reduced end of a rod 114 which extends through an annular flange 116 carried by the ring 80. The rod 114 also extends through the upper end of the cylindrical member 46 and underneath the latter is provided with a nut 118. The lower portion of the rod 114 is socketed to receive the upper end of the rod 38. The shaft 82 is connected by a coupling 120 with a telescopic shaft section 122 which at its outer end is connected by a coupling 124 with a shaft 126 to which is secured a gear 128 in mesh with a gear 130 secured to a shaft 132. The shaft 132 is mounted in projections 134 and 136 extending downwardly from the tabletop 104, while the shaft 126 is mounted in the projection 136. Secured to the shaft 132 is a gear 138 which meshes with a gear 140 loose on a sleeve 142 rotatably mounted in the projections 134 and 136 and in a projection 144 extending down from the tabletop 104. As shown in Fig. 6, the gear 140 has an internal keyway adapted to be engaged by a key 146 having beveled corners. This key is normally held outwardly by a leaf spring 148 and is attached to the end of a rod 150. Keyed on the outer end of the sleeve 142 is a handwheel 152 by means of which this sleeve may be rotated. The hub of the wheel 152 is provided with a recess containing a spring-pressed ball 154 adapted to engage in any one of a number of notches in the rod 150 and hence serve as a stop to hold the rod 150 in desired position when it is slid in or out. When the key 146 is engaged with the gear 140 as shown in Fig. 6 and the wheel 152 is turned, the train of gears 140, 138, 130, and 128 will cause the shaft 82 to rotate and turn the lower bevel ring 80. When the key 146 is moved into engagement with the keyway of a gear 156 normally loose on the sleeve 142 rotation of the hand wheel 152 will cause the gear 156 to rotate the meshing idler gear 158 and also the gear 160 meshing with this idler and secured to a screwthreaded shaft 162 which is threaded through a nut 164 secured to the central portion of a cross bar 166. As shown in Fig. 2, the bar 166 is attached to the forward ends of a pair of slidable rods 168 and 170 and the rear ends of these rods are pivotally attached to links 172 and 174 respectively which in turn are pivotally attached to projections 176 on the lower side of a foot board 178 pivotally attached by a pair of rods 180 to the tabletop 104. By means of these connections, the foot board may be raised and lowered by turning the handwheel 152. When the key 146 is moved into engagement with the keyway of a gear 182 normally loose on the sleeve 142 rotation of the handwheel 152 will cause the gear 182 to rotate the meshing idler gear 184 and the gear 186 meshing with this idler and secured to a shaft 188. This latter shaft has secured thereto a bevel gear 190 in mesh with a bevel gear 192 secured to a cross shaft 194 to which is secured a bevel gear 196 meshing with a bevel gear 198 secured to a longitudinal shaft 200. Secured to the inward ends of the shafts 188 and 200 are bevel gears 202 and 204 respectively which mesh with bevel gears 206 and 208 screwthreadedly mounted on threaded shafts 210 and 212 which at their upper ends carry a kidney rest 214 positioned above substantially the middle portion of the table top 104. By means of the connections just described, the kidney rest may be raised and lowered by turning the handwheel 152. The kidney rest does not need to be adjusted as often as the footboard and the tabletop and, hence, the following arrangement may be conveniently adopted. The end of the rod 150 is provided with a head 151 which is slidable in a sleeve member 153 secured upon the sleeve 142. The sleeve member 153 contains two slots 155 and 157 in which a pin 159 secured to the head 151 is adapted to slide. Frictionally mounted on the sleeve member 153 is a ring 161 having slots 163 and 165 adapted to register with the slots 155 and 157 respectively. As will be seen from Fig. 8, the sleeve member 153 carries a pin 167 extending into an arcuate slot 169 in the ring 161. When the slots 161 and 165 register respectively with the slots 155 and 157, the pin 159 can move in these slots so that the key 146 may be engaged with any one of the gears 140, 156, and 182. When the ring 161 is turned from this position, the pin 167 can be moved only to the end of this ring so that the key may be moved quickly

between the gears 140 and 156 without liability of being pushed beyond the gear 156 in the direction of the gear 182. The shaft 44 previously referred to is secured by a coupling 213 to a telescopic shaft section 215 which is connected by a coupling 216 with the shaft 218 rotatably mounted in a projection 220 extending down from the tabletop as shown in Fig. 7. Secured to the shaft 218 is a gear 222 meshing with a gear 224 loose on a shaft 226 rotatably mounted in the projection 220 and a projection 228. The gear 224 meshes with a gear 230 loose on a sleeve 232 rotatably mounted in the projections 220 and 228. The gear 230 has an internal keyway adapted to be engaged by a key 234 having beveled corners. The key 234 is normally held outwardly by a leaf spring 236 and is attached to the end of a rod 238. Keyed on the outer end of the sleeve 232 is a hand wheel 240 by means of which this sleeve may be rotated. The hub of the wheel 240 is provided with a recess containing a spring-pressed ball 242 adapted to engage in any one of a number of notches in the rod 238 and hence serve as a stop to hold the rod in desired position when it is slid in or out. When the key 234 is moved into engagement with the keyway of the gear 230 and the handwheel is turned, the shaft section 215 and shaft 44 will be rotated and the tabletop moved up or down according to the direction in which the handwheel is rotated. When the key 234 is in engagement with the keyway of a gear 244 as shown in Fig. 7, rotation of the handwheel 240 will cause the gear 244 to rotate a meshing gear 246 secured to the shaft 226 to which is secured a gear 248 meshing with a gear 250 secured to the outer end of the shaft 100 which is mounted for rotation in the projection 220 and is placed against the end of the sleeve 232. When the shaft 100 is thus rotated, the upper beveled ring 92 will be turned. When the key 234 is moved into engagement with the keyway in a gear 252 rotation of the handwheel 24 will cause rotation of this gear. By referring to Fig. 2, it will be seen that the gear 252 meshes with a gear 254 which in turn meshes with a gear 256 and that the latter gear meshes with a gear 258 which is secured to a shaft 260. A bevel gear 262 secured to the shaft 260 as shown in Fig. 1 meshes with a bevel gear 264 which is interiorly threaded to receive a screw-threaded rod 266 which at its upper end is pivotally attached to a head rest 268 pivoted to the tabletop at 270. By means of the connections just described, the head rest 268 may be adjusted up or down by turning the handwheel 240 in the proper direction.

The operation and advantages of my invention have been fully set forth in the previous detailed description. It will be obvious from an inspection of Figs. 4 and 5, that the tabletop 104 may be given the desired inclination in any direction including a combined longitudinal and transverse inclination by properly turning wedgeshaped rings 90 and 92.

The table top 104 is preferably provided with means for securing the legs of the patient and suitable means for this purpose is shown in Figs. 1, 2, and 13. A pair of hollow blocks 272 is secured to the lower surface of the table top toward the rear end thereof. Rods 274 are held adjustably in these blocks by pincher plates 276 in order that the rods may be raised and lowered. Straps 278 are passed around the legs of the patient and secured to the upper ends of the rods 274. As shown in Fig. 13, ratchet wheels 280 are keyed on the rods 274. Spring-pressed detents 282 pivoted to the blocks 272 normally engage the ratchet wheels and prevent rotation thereof in one direction. The ratchet wheels are so arranged that when the legs of the patient are secured to the straps, the legs cannot be brought closer together but they can be separated still further on account of the ratchet wheels being permitted to rotate in the proper direction for this purpose. It will be understood that for certain operations it is necessary that the legs be held separated at least a certain amount. In such case, if there is a tendency to separate them still further, this action is permitted by the rotation of the ratchet wheels.

I claim:

1. An operating table comprising a table top, a base, two juxtaposed wedge-shaped members interposed between said base and tabletop, and means whereby said members may be independently turned to give said tabletop various inclinations in any direction through an entire circumference of 360°.

2. An operating table comprising a tabletop, a base, two juxtaposed wedge-shaped members interposed between said base and tabletop, a hand wheel, connections between said hand wheel and one of said members whereby the latter may be turned, a second hand wheel, and connections between said second handwheel and the other of said members whereby the latter may be turned.

3. An operating table comprising a table top, a base, a table raising and lowering device, a foot board, a head rest, a kidney rest, two juxtaposed wedgeshaped members interposed between said base and tabletop, hand operable means, and means associated with said hand operable means whereby movement thereof may be caused to selectively operate said foot board, head rest, kidney rest, wedgeshaped members, and table raising and lowering device.

4. An operating table comprising a table top, a base, a table raising and lowering de-

vice, a foot board, a head rest, a kidney rest, two juxtaposed wedgeshaped members interposed between said base and tabletop, a hand wheel, means associated with said hand wheel whereby turning movement thereof may be caused to selectively operate said foot board, kidney rest, and one of said wedgeshaped members, a second hand wheel, and means associated with said second handwheel whereby turning movement thereof may be caused to selectively operate said head rest, table raising and lowering device, and the other of said wedgeshaped members.

5. An operating table comprising a table top, a base, a cylindrical member vertically disposed above said base, two juxtaposed wedgeshaped rings rotatably interposed between said cylindrical member and tabletop, a universal joint connecting said tabletop and cylindrical member, and means for independently turning said rings to tilt said tabletop.

6. An operating table comprising a tabletop, a base, a cylindrical member vertically disposed above said base, means for raising and lowering said cylindrical member, two juxtaposed wedgeshaped rings rotatably interposed between said cylindrical member and table top, a universal joint extending through said rings and connecting said tabletop and cylindrical member, and means for independently turning said rings to tilt said table top.

7. An operating table comprising a table top, a base, a cylindrical member vertically disposed above said base, a screw threaded rod adapted to raise and lower said cylindrical member, a foot board, a head rest, a kidney rest, two juxtaposed wedgeshaped rings rotatably interposed between said cylindrical member and tabletop, a universal joint extending through said rings and connecting said tabletop and cylindrical member, two hand wheels, and means associated with said hand wheels whereby their turning movement may be caused to selectively operate said screwthreaded rod, foot board, head rest, kidney rest, and wedgeshaped rings.

8. An operating table comprising a table top, a base, a tube secured to said base and extending upwardly therefrom, a cylindrical member slidably mounted on said tube, a second tube secured to said base and extending up inside said cylindrical member, a nut secured to said last mentioned tube, a vertical screw-threaded rod engaging the threads of said nut and rotatably mounted with relation to said cylindrical member, two juxtaposed wedge-shaped rings rotatably interposed between said cylindrical member and tabletop, a universal joint extending through said rings and connecting said tabletop and cylindrical member, a hand wheel, means associated with said hand wheel whereby turning movement thereof may be caused to selectively operate said screw-threaded rod and one of said rings, a second hand wheel, and means associated therewith for operating the other of said rings.

In testimony whereof I hereunto affix my signature.

ANTOINE A. LAURENT.