Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 1

FIG. 1.

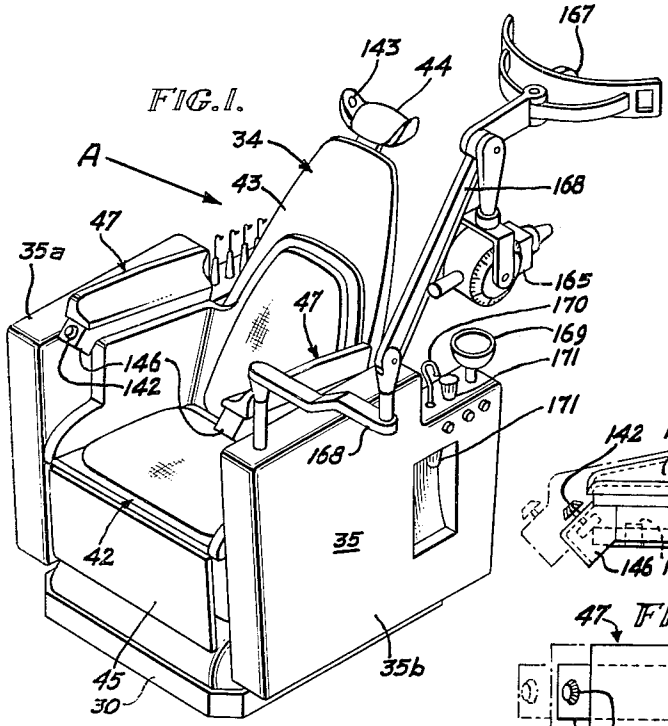


FIG. 5.

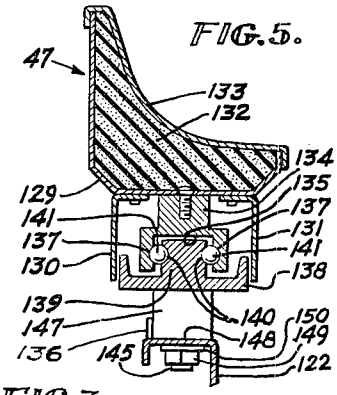
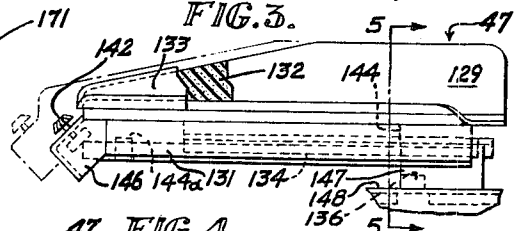


FIG. 3.



47 FIG. 4.

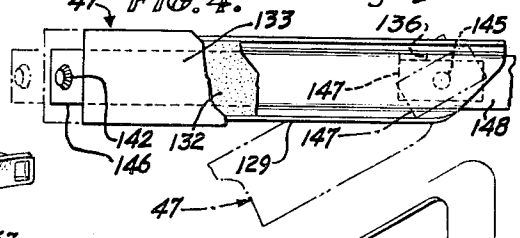


FIG. 2.

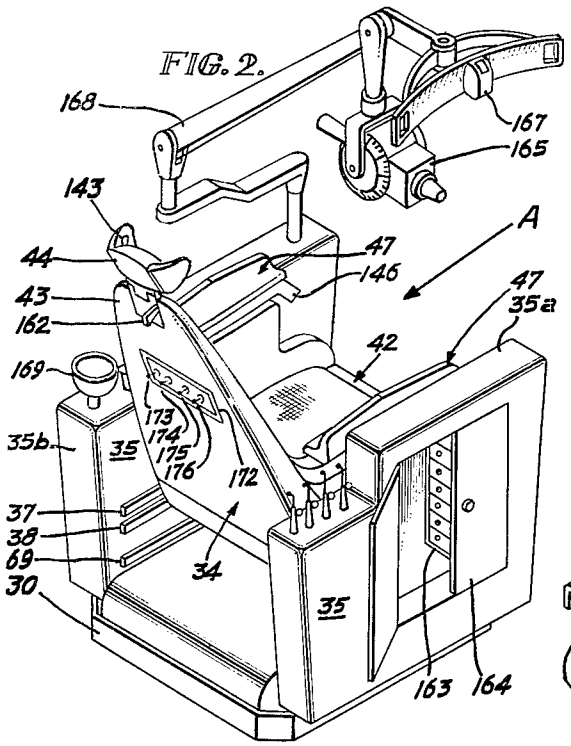
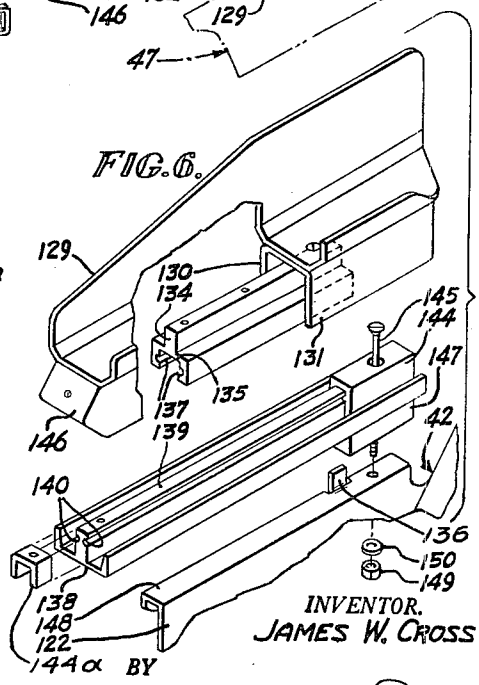


FIG. 6.



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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 2

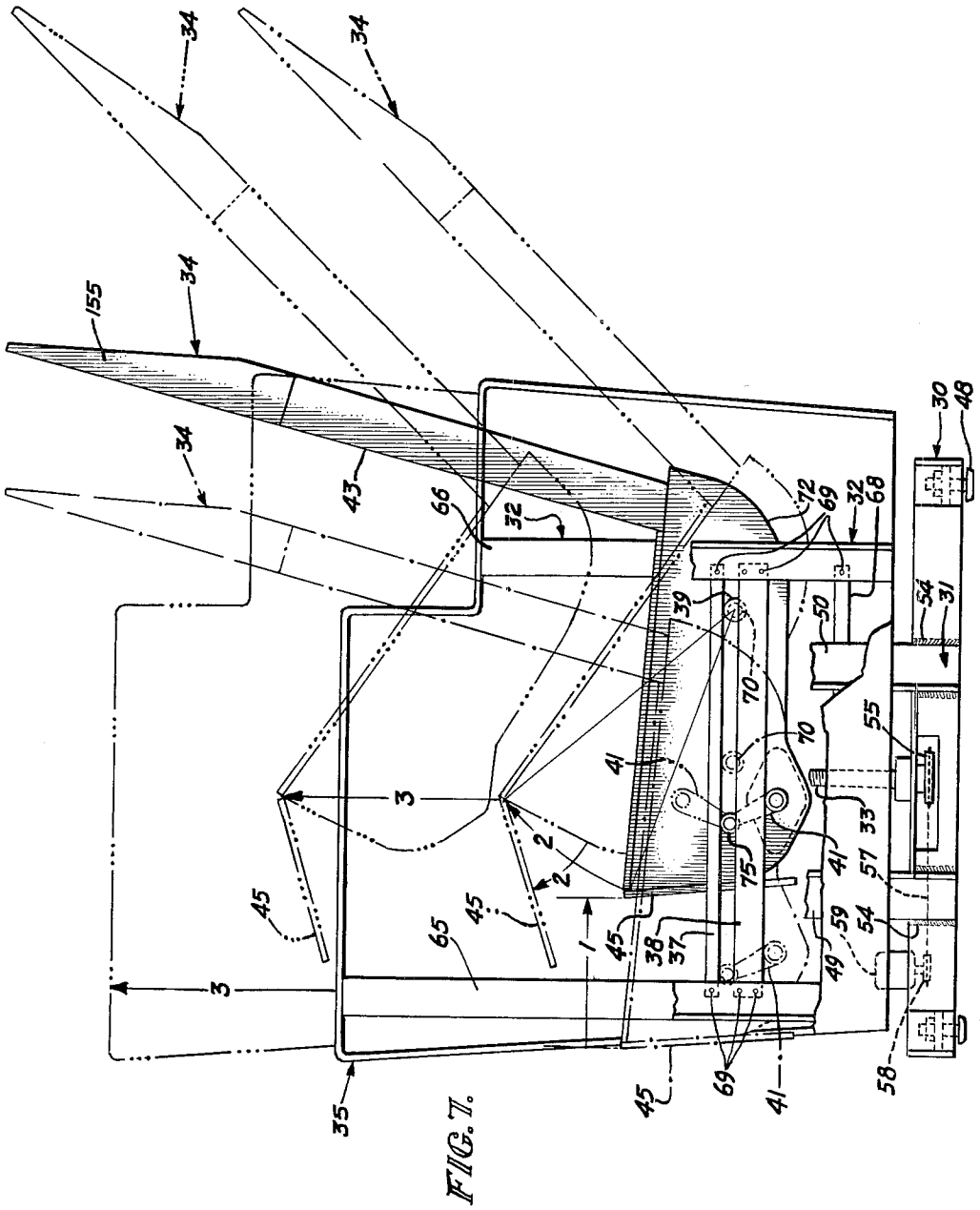


FIG. 1.

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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 3

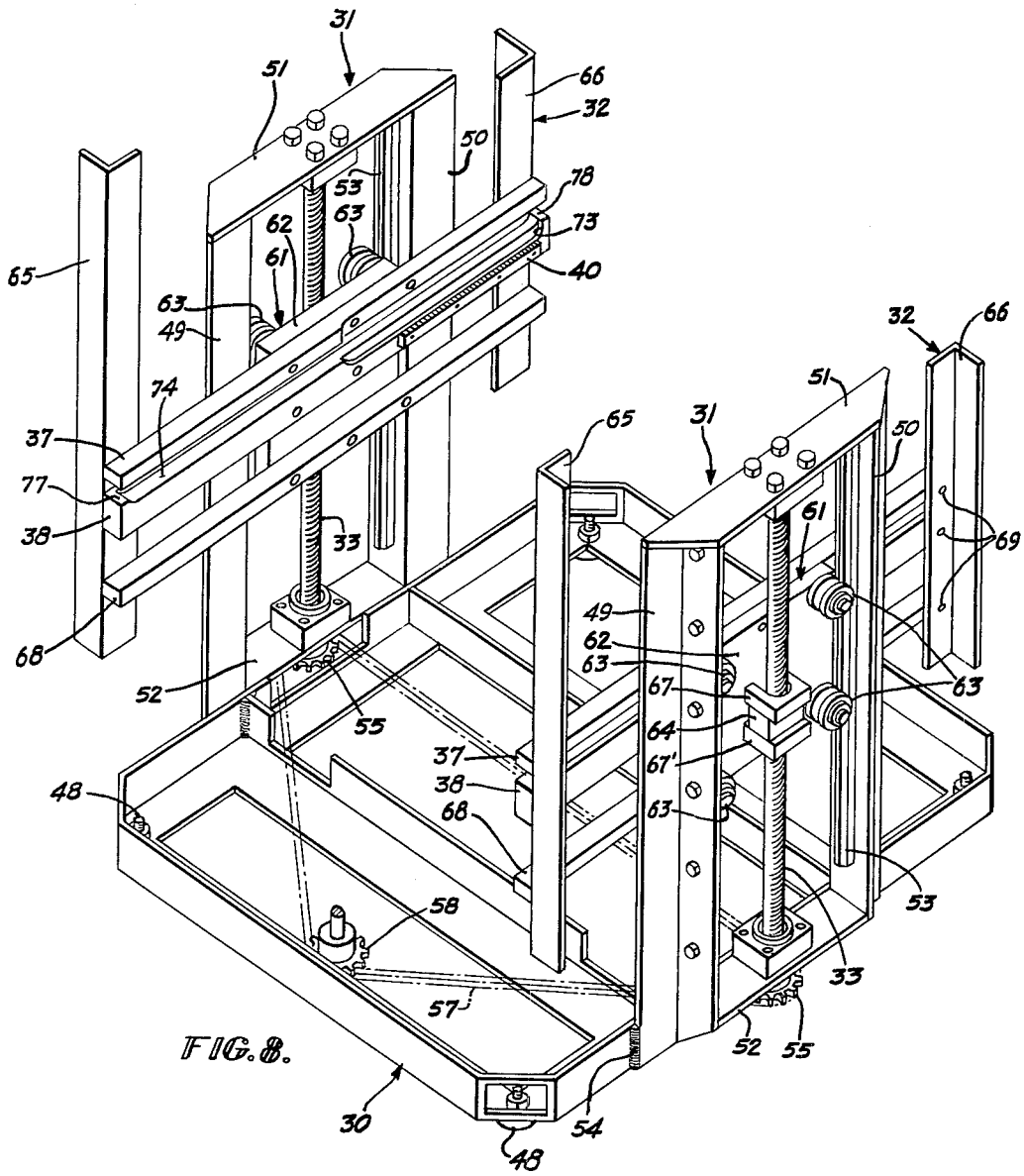


FIG. 8.

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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 4

FIG. 9.

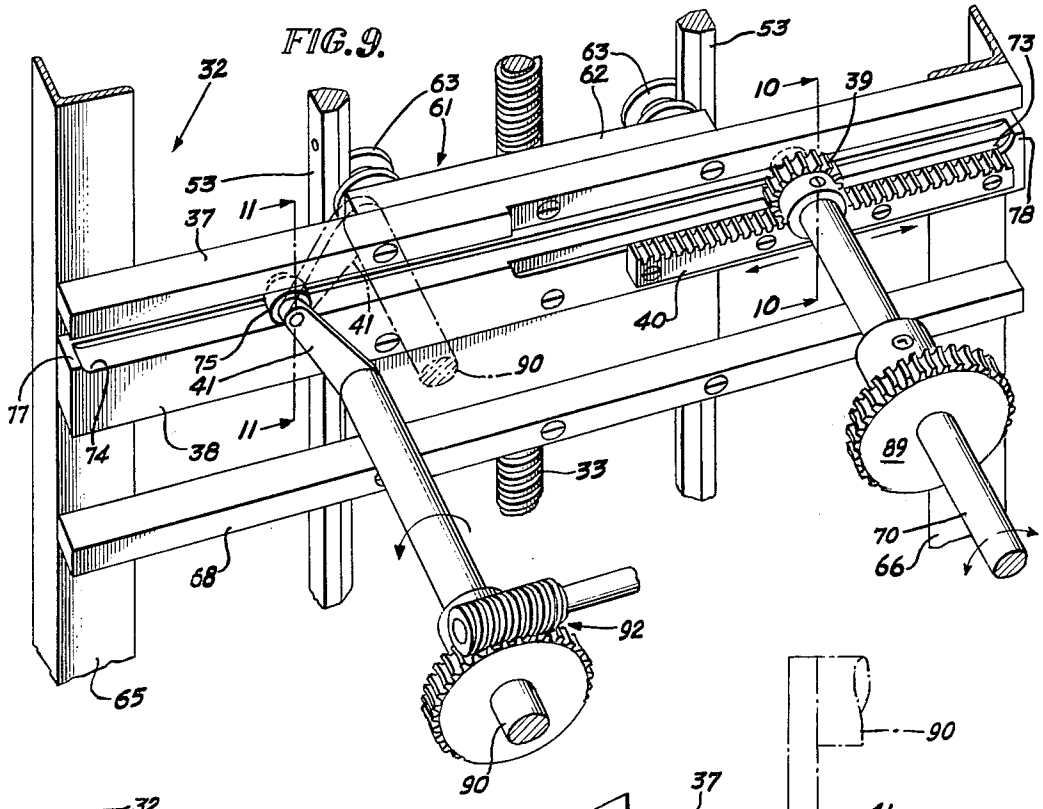
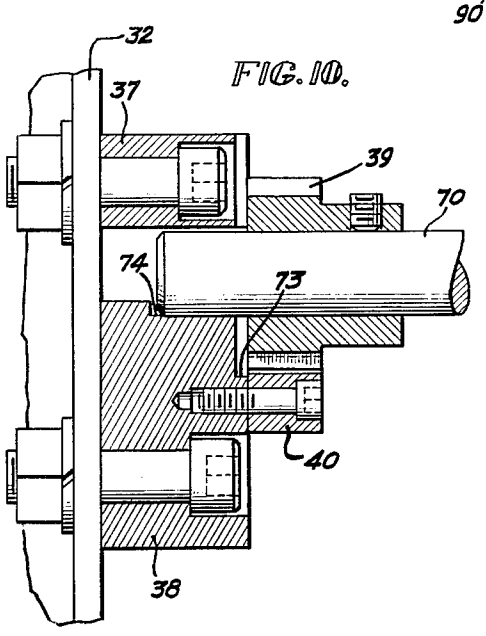


FIG. 10.



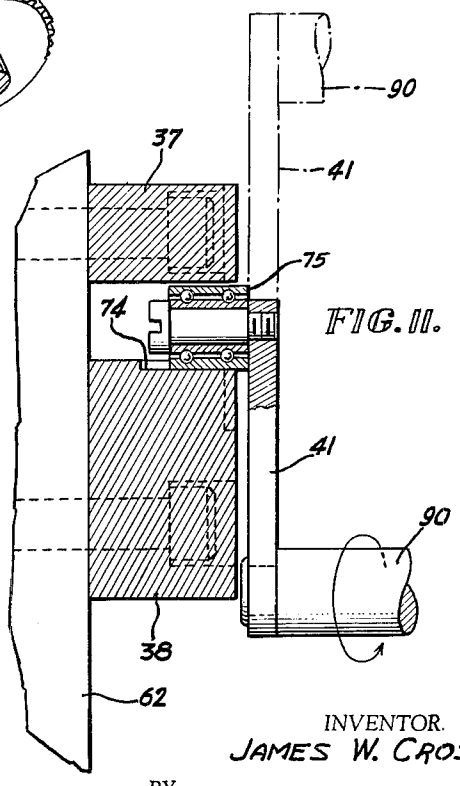


FIG. 11.

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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 5

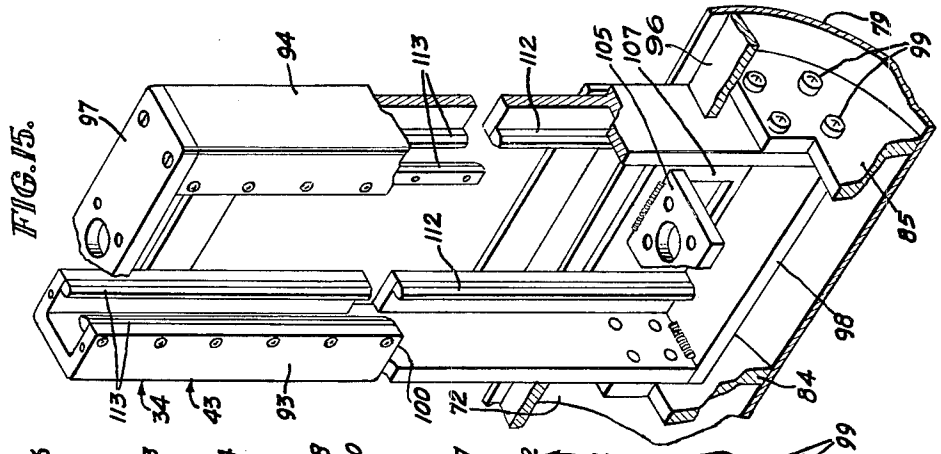


FIG. 15.

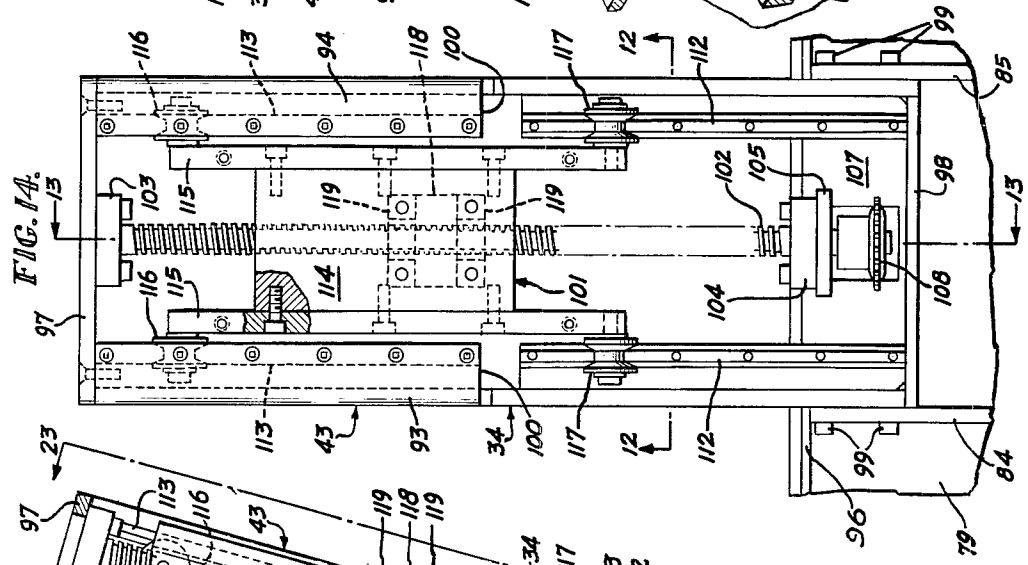


FIG. 14.

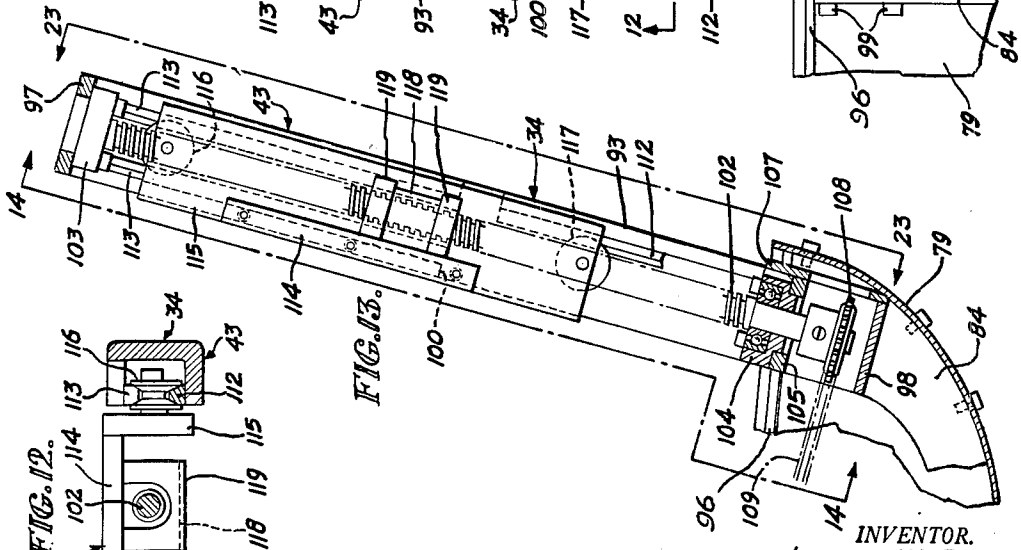


FIG. 13.

FIG. 12.

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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 6

FIG. 16.

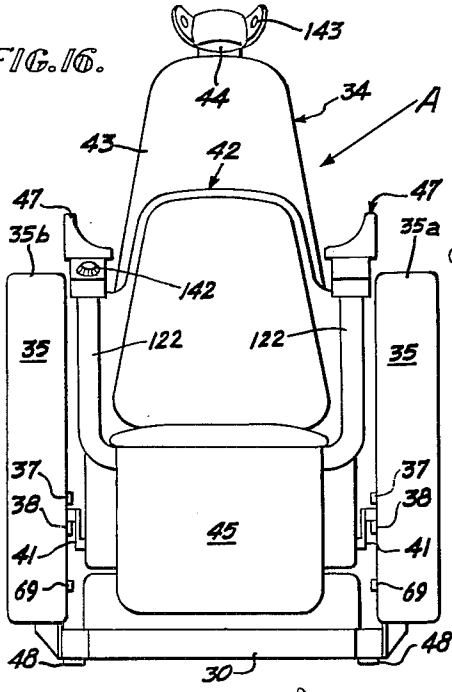


FIG. 18.

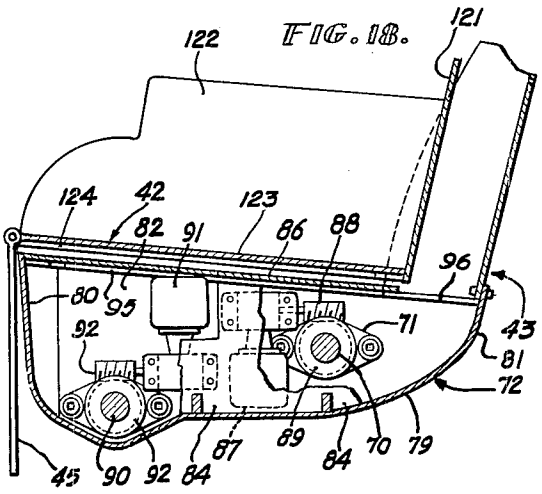


FIG. 17.

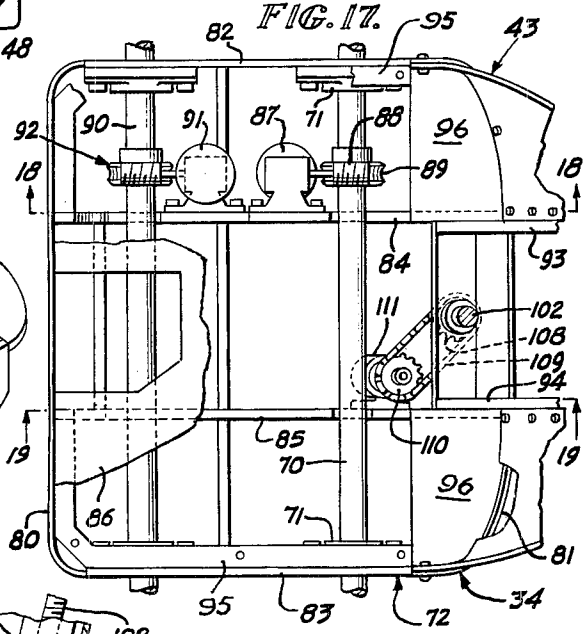


FIG. 20.

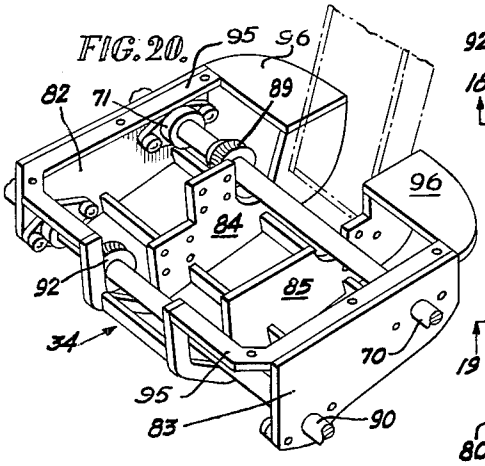
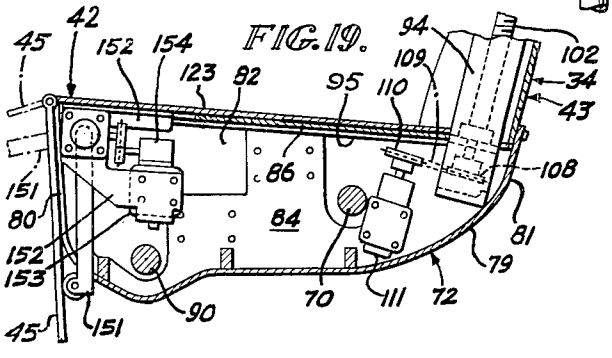


FIG. 19.



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Dec. 7, 1965 J. W. CROSS 3,222,105

DENTAL CHAIR WITH CONSOLES

Filed Jan. 23, 1964 7 Sheets-Sheet 7

FIG. 21.

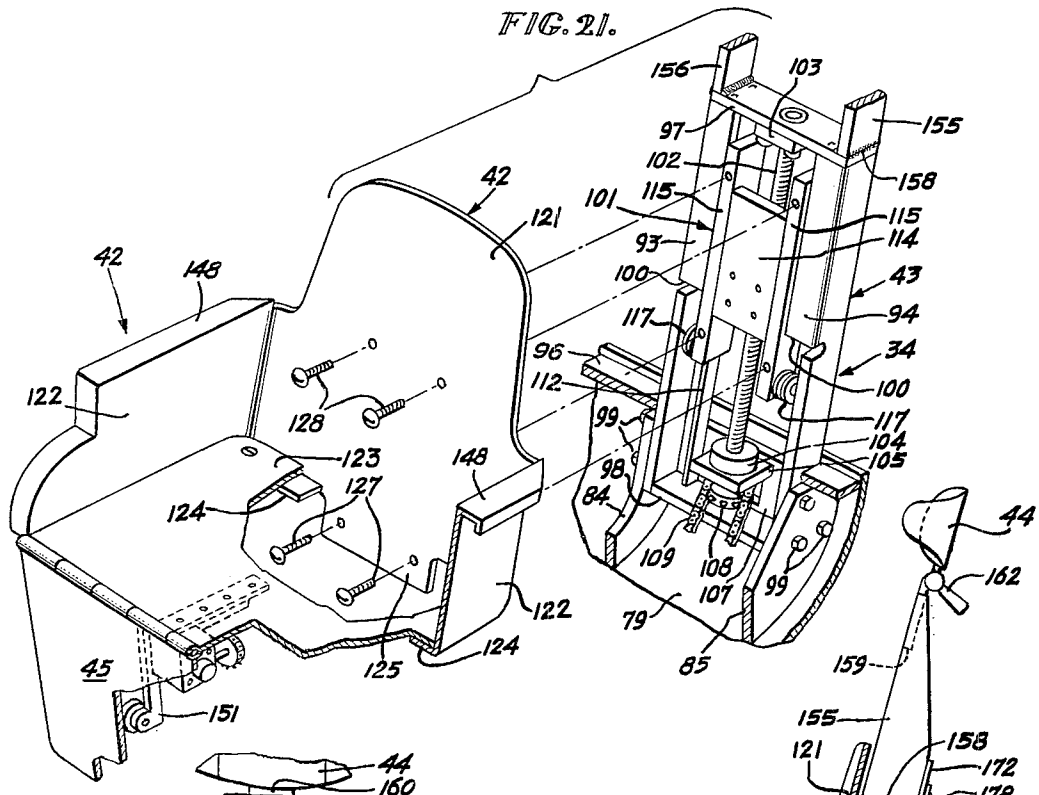


FIG. 22.

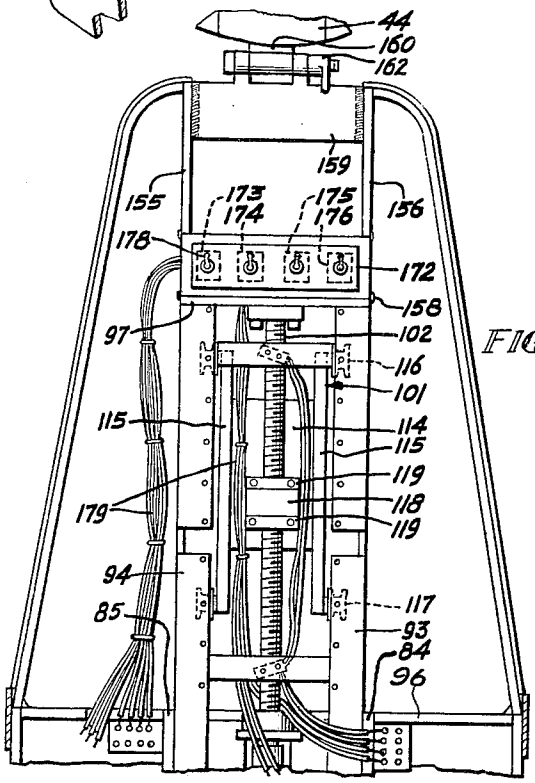


FIG. 23.

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United States Patent Office 3,222,105
Patented Dec. 7, 1965

3,222,105

DENTAL CHAIR WITH CONSOLES

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Filed Jan. 23, 1964, Ser. No. 339,654
11 Claims. (Cl. 297—188)

The present invention relates to a dental operative chair which may be adjusted to position a patient seated comfortably therein in selected relation to the dentist, and to a pair of vertically adjustable consoles mounted one on each side of the chair.

In the past, various types of dental chairs have been developed, and although many of such prior chairs are capable of being raised and lowered, and some thereof are provided with other adjustments, such prior chairs are not capable of the full selective adjustment required to position a patient's head and a pair of operative consoles in selected positions for maximum efficiency and effectiveness by a dentist using the chair.

The present invention provides a dental chair wherein a seat support is adjustable vertically in conjunction with a console, and is provided with a plurality of other adjustments for positioning a patient's head in a desired fore-and-aft location and at a desired angle of tilt relative to the console and to a dentist using the chair.

Another object of the invention is to provide an improved dental chair having a seat support which is tiltable to various angles of inclination from the vertical, and is also transportable bodily both vertically and in a fore-and-aft direction, and wherein a seat is mounted for adjustment on the seat support to position the head of a patient seated in the chair in a selected position relative to a head rest mounted on the upper end of the seat support.

Another object of the invention is to provide an improved dental operative chair.

These, and other objects and advantages of the invention, will be apparent from the following description and the accompanying drawings, wherein:

FIG. 1 is a perspective view of a dental operative chair embodying the invention, as viewed from the front quarter and above, the seat being shown in its lowermost, upright, forward position.

FIG. 2 is a perspective view of the chair shown in FIG. 1 as viewed from the rear quarter and above.

FIG. 3 is an enlarged, fragmentary, side elevational view of one of the adjustable arm rests, portions thereof being broken away, the dash-dot lines showing the arm supporting portion thereof moved forwardly from its rearmost, solid line position.

FIG. 4 is a top, plan view of the arm rest structure shown in FIG. 3, the dash one-dot lines showing the slidable arm supporting portion moved forwardly slightly, the dash two-dot lines showing the arm rest as it appears when swung inwardly, portions being broken away.

FIG. 5 is a sectional view taken along line 5—5 of FIG. 3.

FIG. 6 is an exploded, isometric projection of the arm rest shown in FIGS. 3–5, the upholstery being removed, and portions being broken away.

FIG. 7 is a side elevational view of the unitary base and side frames of the chair, with the L-shaped seat support shown in various positions of adjustment thereon.

FIG. 8 is an isometric projection showing the base and side frames with the console and seat support track frames mounted thereon.

FIG. 6 is an enlarged, fragmentary, isometric projection of one console and seat support track frame, and portions of the longitudinal adjusting and tilting mechanism for the seat support, portions of the vertical track strips and the elevating screw associated therewith being included.

FIG. 10 is a further enlarged, fragmentary, sectional view taken along line 10—10 of FIG. 9.

FIG. 11 is a similarly enlarged, fragmentary, sectional view taken along line 11—11 of FIG. 9.

FIG. 12 is a transverse sectional view of the elongated back portion of the L-shaped seat support taken along line 12—12 of FIG. 14.

FIG. 13 is a longitudinal sectional view taken along line 13—13 of FIG. 14.

FIG. 14 is a fragmentary, front elevational view of the elongated back portion of the L-shaped seat support as viewed in the direction of the arrows 14—14 in FIG. 13, the seat carriage being shown mounted for longitudinal adjustment thereon.

FIG. 15 is an isometric projection of the structure shown in FIGS. 13 and 14, the seat carriage being omitted, and portions being broken away.

FIG. 16 is a front elevational view of the chair shown in FIGS. 1 and 2, the shortness of the back of the seat relative to the elongated back portion of the seat support being apparent.

FIG. 17 is a fragmentary, top, plan view of the boxed-in lower portion of the L-shaped seat support.

FIG. 18 is a fragmentary, vertical, longitudinal sectional view taken along line 18—18 of FIG. 17, fragments of the seat in its lowermost position being included.

FIG. 19 is a similar sectional view taken along line 19—19 of FIG. 17.

FIG. 20 is a perspective view of the boxed-in lower portion of the L-shaped seat support with the top plate and drive motors removed.

FIG. 21 is an exploded view showing portions of the L-shaped seat support with the seat carriage mounted thereon, and the seat removed forwardly from the carriage, portions being broken away.

FIG. 22 is an enlarged side elevational view of the parts shown in FIG. 21, but with the seat assembled on its carriage, a portion of one side channel being broken away.

FIG. 23 is a fragmentary, rear elevational view in reduced scale of the back portion of the seat support with the rear cover plate removed, some of the electric cables being shown, the boxed-in lower portions being broken away.

Briefly, the illustrated embodiment of the invention comprises a dental operative chair A having a fixed base frame 30 (best shown in FIG. 8) with vertical side frames 31 secured thereto. A pair of console and seat support track frames 32 are mounted for vertical movement one on each side frame, and are adjusted vertically thereon by a pair of jack screws 33, one of which is journaled in each side frame 31. A console 35 having selected operative and other equipment mounted thereon, is provided on each console and track frame 32.

An L-shaped seat support 34 is mounted for selective fore-and-aft travel, and forward and rearward tilting movement, on spaced, horizontal, double tracks 37 and 38, a pair of which is provided on each of the vertically adjustable console and track frames 32.

Forward and rearward travel of the seat support 34 along its tracks 37 and 38 is accomplished by a pair of reversible, power driven pinions 39 (FIG. 9) riding on racks 40 (FIGS. 8 and 9) secured along the lower tracks 38. Tilting of the seat support 34 is accomplished by reversible, power driven lever arms 41 (FIGS. 7 and 9) having rollers on their free ends riding between the tracks 37 and 38 (FIGS. 7 and 9).

A seat 42 (FIGS. 1, 2, 16, 21 and 22) is mounted for adjustment lengthwise of the upright back portion 43 of the L-shaped seat support 34, thereby to position a patient of whatever size with his head positioned in a head rest 44 mounted on the upper end of the seat support back

portion 43. A swing-out leg rest 45 (FIGS. 1, 7, 16, 17, 18 and 21) is hingedly mounted on the forward edge of the seat 42 and is operated in conjunction with the tilting mechanism of the seat support 34 so that, as shown in FIG. 7, as the seat support is tilted rearwardly, the leg rest swings upwardly to leg supporting position, and vice versa.

An arm rest 47 (FIGS. 1–6) is mounted for combined swiveled and forwardly extensible movement on each side of the seat 42.

Referring to the drawings in greater detail, the chair A illustrated is a prototype model, most of the parts of which are made from stock structural metal shapes. When the chair is to be made ready for production, the parts thereof will be re-designed as smoothly contoured castings, stampings and moldings.

With one or two exceptions, both sides of the illustrative chair A are symmetrical, but reversed. The same reference numerals are, therefore, used to refer to corresponding parts on both sides of the chair.

The chair A comprises the rectangular base frame 30, with a leveling screw 48 (FIG. 8) provided one at each corner thereof. Each vertical side frame 31 comprises a pair of upright angle members 49 and 50 secured in spaced, parallel relation by top and bottom plates 51 and 52. A pair of beveled track strips 53 are secured to the inner side of each upright side frame members 49 and 50. The side frames 31 are secured, as by welds 54 (FIG. 7), in laterally opposite relation, one on each side of the base frame 30. Each side frame 31 has one of the jack screws 33 journaled in axially vertical position centrally thereof, and with its axis parallel to the track strips 53. For driving the jack screws 33, a sprocket 55 is secured to the lower end of each thereof, and a drive chain 57, passed around these sprockets and around the drive sprocket 58 of a reversible electric motor 59 (FIG. 7) turns the jack screws 33 synchronously in a desired direction.

Each console and seat support track frame 32 (best shown in FIG. 8) comprises a carriage portion 61, consisting of a rectangular body portion 62, which may be of steel plate, with two grooved guide wheels 63 journaled on each forward and rearward edge thereof. These guide wheels 63 ride on the vertical beveled track strips 53.

For operatively connecting each console and seat support frame 32 to its associated jack screw 33, the latter is screwed into a nut block 64, which is inserted between a pair of U-shaped brackets 67 and 67′ secured to the outer face of each body plate 62. The jack screw 33 rides freely within the brackets 67 and 67′.

The double, horizontal tracks 37 and 38 on each console and track frame 32 are parallel to each other, and to those on the opposite frame 32, and, together with a lower reinforcing bar 68, are secured to the inner side of each carriage body plate 62. Upright angle members 65 and 66 are secured by machine screws 69 (FIGS. 7 and 8) to the front and rear ends, respectively, of the track members 37 and 38, and the lower member 68, for supporting the consoles 35 thereon.

One of the seat supporting traversing racks 40 (FIGS. 8–10) is secured along the inner side of the rear portion of each lower track 38, and one of the pinions 39, mounted one on each end of a seat support traversing shaft 70 (FIGS. 9, 10 and 17–20) rides along each rack 40 in mesh therewith. The traversing shaft 70 is journaled in bearings 71 (FIG. 20) mounted in the boxed-in lower portion 72 of the L-shaped seat support 34 near the rear end thereof. An elongated rabbeted recess 73 is provided along the upper, inner side of each lower track 38 to provide clearance for the pinions 39 when the latter roll along their racks 40 to adjust the fore-and-aft position of the seat support 34 thereon.

A recess 74 (FIGS. 8, 9 and 11) is also provided in the top of each lower track 38 to provide clearance for the ends of the pinion shaft 70, and for rollers 75 (FIGS. 9 and 11) one of which is journaled on the free end of each of the seat tilting lever arms 41 (FIGS. 7, 9 and 11). Each top recess 74 terminates just short of each end of its lower track 38 to provide end abutments 77 and 78 (FIGS. 8 and 9) which limit forward movement of the rollers 75, and rearward movement of the pinion shaft 70, respectively.

The L-shaped seat support 34 comprises the boxed-in lower portion 72, and the upwardly extending, and preferably slightly rearwardly inclined, back portion 43. The lower portion 72 (FIGS. 17–20) comprises a formed bottom plate 79 of sheet metal having an upwardly bent front portion 80 and rear portion 81. A pair of sturdy, vertical side members 82 and 83, and fore-and-aft partitions 84 and 85 of suitable material such as steel or aluminum, are secured to the bottom plate 79, and a flat top plate 86 (FIGS. 17–19) is removably mounted on marginal flanges 95 and rear panels 96 secured within the upper portion of the seat bottom portion 72.

The rear or transport shaft 70, with its pinions 39 secured one on each end thereof, is driven by a reversible electric motor 87 (FIGS. 17 and 18) through a speed reducing worm pinion 88 and worm gear 89.

A front, or seat tilting shaft 90 (FIGS. 17–20) to which the lever arms 41 are secured, is driven (FIGS. 17 and 18) by a reversible electric motor 91 through speed reducing gears 92. The lever arms 41 are of equal length and lie in the same radial plane relative to the shaft 90 upon which they are mounted, and the rollers 75 on the outer ends of the arms 41 may be conventional ball bearings.

The upright back portion 43 of the seat support 34 comprises a pair of inwardly facing channel members 93 and 94, of strong, rigid construction, which are secured in spaced, parallel relation to the inner sides of the partitions 84 and 85 of the seat support lower portion 72 by bolts 99, and are interconnected by top and bottom frame members 97 and 98. The lower portion of the forward flange of each channel member 93 and 94 is cut away at 100 to facilitate the mounting of a seat carriage 101 thereon.

A seat adjusting jack screw 102 (FIGS. 12–15, 17 and 19) is journaled midway between the channel members 93 and 94 in a pair of axially aligned bearings 103 and 104, the axis of the jack screw being parallel to the channel members. The upper bearing 103 is mounted on the under side of the upper transverse frame member 97, while the lower bearing 104 is mounted on a bracket 105 secured to a back plate 107 which is mounted across the lower ends of the channel members 93 and 94.

A drive sprocket 108 is mounted on the lower end of the jack screw 102, and is driven by a drive chain 109, which passes around this sprocket, and also around the drive sprocket 110 (FIGS. 17 and 19) of a gear reduction type, reversible electric motor 111 mounted in the seat support lower portion 72.

Beveled track strips 113 are secured to the inner sides of both the forward and rear flanges of the upper portions of the channel side members 93 and 94, while similar track strips 112 are similarly secured to the forward side of the lower, rear channel flanges. All of the track strips 112 and 113 are parallel to each other and to the axis of the jack screw 102.

The seat carriage 101 comprises a body portion 114 and a pair of parallel side bars 115 secured (FIGS. 12, 13, 14, 21 and 22) along the sides thereof. A pair of upper grooved guide rollers 116 are mounted in axially parallel relation near the upper end of each of the side bars 115 to ride with a rolling fit between the opposed upper beveled track strips 113, and a similar pair of lower guide rollers 117 ride on the lower beveled track strips 112. The lower rollers 117 require no restraining or guiding tracks forwardly thereof, since the pressure on these rollers is always rearwardly, regardless of the angle of tilt of the seat support 34.

Operative engagement between the seat carriage **101** and the seat adjusting jack screw **102** is provided by a nut block **118**, and U-brackets **119** similarly to those **64** and **67** provided for the jack screws **33** described previously herein.

The seat **42** (FIGS. 1, 2, 16, 21 and 22) may be fabricated from suitable material, such as, for example, sheet metal or plastic, the latter, if preferred being reinforced with glass fibers. As illustrated, the seat **42** comprises substantially integral back portion **121** and side portions **122**, with a bottom plate **123** secured to inwardly extending flanges **124** provided along the lower edges of the seat side and back portions. A downward extension **125** (FIG. 21) is provided centrally of the seat back portion **121** for connection, by screws **127**, to the lower end of the seat carriage **101**. Other screws **128** connect the upper portion of the seat back to the upper end of the carriage. The seat back **121** is inclined slightly rearwardly relative to the bottom plate **123** at a comfortable seating angle, preferably corresponding to that between the top plate **86** of the bottom portion **72** of the L-shaped seat support **34** and the back portion **43** thereof.

The side portions **122** of the seat **42** are of such a height that when the adjustable arm rests **47** (FIGS. 1–6 and 16) are mounted thereon, the tops of these arm rests will be at a comfortable height for one seated in the chair A, for example, of the order of seven or eight inches above the seating surface. Each arm rest **47** (FIGS. 3–6) comprises an upholstered, trough shaped, sheet metal member **129**, having downwardly extending flanges **130** and **131** secured one along each side thereof. The troughed member **129** is padded with suitable material **132** (FIG. 5) such as foam rubber, and is covered with a sheet of suitable material **133**, such as fabric or leather.

An inverted, T-shaped rib **134** is secured lengthwise medially of the underside of the troughed member **129**, and a groove **135** is provided lengthwise of the under side of the head portion of this T-shaped rib **134**. A pair of laterally opposite ball-run grooves **137** are provided along the two sides of this groove **135**.

A channel shaped support member **138**, having a central rib **139** therein, is swiveled on the rear end of each seat arm **122**. The center rib **139** fits freely within the groove **135**, and has ball run grooves **140** along the two sides thereof to co-operate with those in the sides of the groove **135**. A plurality of bearing balls **141** ride in a well known manner between each registering pair of the grooves **137** and **140**, as best shown in FIG. 5, to provide free lengthwise rolling support for the arm rests **47**. The forward ends of the troughed members **129** are boxed in as at **146**, and a conventional control knob **142** may be mounted thereon for manipulation by a patient to control radio or recorded music transmitted by usual circuit means to ear phones **143** mounted in the head rest **44**.

Inverted, channel shaped stop members **144** and **144***a* are fitted over the front and rear ends, respectively, of the center rib **139** of the swiveled support channel **138** to engage the inverted T-shaped rib **134** and thus limit forward and rearward movement of the member **129** along this rib. Also a stop member **136** is secured to each seat arm **122** to limit outward swinging movement of the swiveled arm supports **47**.

A swivel bolt **145** passes through aligned holes in the stop member **144**, the swiveled channel **138**, and a spacing block **147**, which is secured to the under side of each swiveled channel support member **138** at its rear end. This swivel bolt **145** also passes through a hole provided therefor in a flange **148** formed along the upper edge of each seat arm **122**, and is anchored thereto by a nut **149** and washer **150**. Thus, each upholstered arm rest **47** supports the forearm of a patient seated in the chair, and may be extended lengthwise thereof along its swiveled support channel **138**. It also may be swung inwardly across the front of a person seated in the chair, which is usually a more comfortable position than with the forearms held parallel along the sides.

The swing-out leg rest **45** (FIGS. 1 and 16–19) is hingedly mounted on the forward edge of the seat bottom plate **123**. This leg rest **45** is actuated by a lever arm **151** pivotally mounted on a bracket **152** secured to the under side of the seat bottom plate **123**, and driven by a reversible electric motor **153** through conventional reduction gearing **154**. The motor **153** is connected by conventional electric circuit means to operate simultaneously with the L-shaped seat support **34**, so that as the latter is tilted rearwardly from its solid line position of FIG. 7, the leg rest **45** will swing upwardly toward its dash-three-dot position of FIG. 7, and vice versa.

The dimensions of the chair A are such that the seat **42**, in its lowermost, upright position as shown, for example, in FIG. 1, is preferably at a comfortable height for a patient to enter and leave, for example, with the seating surface thereof at a height of approximately 18 inches from the floor. The height of the back portion **43** of the seat support **34** is such as to accommodate the tallest person for which the chair is intended with the seat **42** in its lowermost position, while the back **121** of the seat **42** is sufficiently short to permit the shortest person for which the chair is intended to be elevated to a position where his head will be comfortably supported on the head rest **44**.

A pair of upwardly tapered, top extension plates **155** and **156** (FIGS. 7, 21, 22 and 23) are secured, as by welding **158** one to each end of the transverse top frame member **97** to extend upwardly therefrom. A head rest support plate **159** (FIGS. 22 and 23) is mounted transversely between tapered plates **155** and **156**, and the head rest **44** is hingedly mounted on the upper edge of the support plate **159**. A lever **162** (FIG. 2) anchors the head rest in adjusted position.

The consoles **35**, which may be of wood or metal cabinet construction, are mounted on each console and seat support frame **32** for vertical movement therewith. The console **35***a* on the right hand side of the chair illustrated in FIGS. 1 and 2 is equipped for use by the dentist, and the other **34***b* by the nurse, which arrangement is preferable for use by a right handed dentist. A reversal of this console arrangement would be preferable for use by a left handed dentist.

Various types of instrument holders, and electrical and electronic instruments and equipment may be mounted on and in each of the consoles as desired. For example, as shown in FIGS. 1 and 2, an instrument cabinet **163** is mounted on a swing out door **164**, while electric or air drills and other operative implements may be mounted in sockets or supports provided therefor along the top of the console. An X-ray head **165** and light projector **167** are mounted on an articulated arm **168** swiveled on the nurse's console **35***b*, as are also an irrigated cup **169**, suction drainage tube **170**, and water cups **171**. The illustrated equipment on the consoles is suggestive only, as various arrangements can and will be provided to suit the convenience, requirements, and desired monetary outlay of each owner of one of the chairs.

For controlling the operation of the chair A, a switch plate **172** (FIGS. 2, 22 and 23) is mounted across the lower ends of the tapered top extension plates **155** and **156**, and four double-throw reversing switches **173**, **174**, **175** and **176**, which are self restoring to a central "OFF" position, are mounted thereon. Three of these switches **173**, **174** and **175** are operatively connected, respectively, by conventional reversing motor circuits, not shown, to the reversible elevating motor **59** (FIG. 7), seat transport motor **87** and seat control motor **111** (FIGS. 17 an 18), while the fourth switch **176** is operatively connected to both the tilt control motor **91** and the leg rest actuating motor **153**. Thus, when the actuating lever **178** of a selected switch is tilted in one direction, it causes the motor or motors to which it is connected to rotate in

one direction, and when tilted in the opposite direction it causes such motor or motors to rotate in the reverse direction, while when the switch lever is released, its switch automatically returns to a central "OFF" position.

A suitable arrangement for cabling and mounting various conductor wires **179** of the various electrical circuits employed is shown in FIG. 23. Since the required circuits, and the manner of installing the wiring thereof is conventional, and will be readily apparent to any ordinarily skilled engineer or electrician familiar with the art, and since the details thereof are not material to the present invention, they are not illustrated or described herein.

The operation of the illustrated form of the invention is as follows: When seating a patient in the chair A, the seat support **34** preferably is in its maximum forwardly tilted position, and maximum forward limit of movement as shown in FIGS. 1, 2 and 16, and in dash-one-dot lines in FIG. 7. The chair will ordinarily be in this position after the exit of a previous patient from the chair, but if not, the seat support **34** is tilted forwardly by actuating the switch **176** in a direction to swing the tilt lever arms **41** to their maximum upwardly swung position, as shown in dash-one-dot lines in FIG. 7. This same action of the switch **176**, as mentioned previously herein, simultaneously actuates the leg rest control motor **153** to lower the leg rest **45** to its fully down-swung, solid line position of FIG. 7.

Forward transport movement of the seat support **34** is accomplished by actuating the motor **87**, by means of its switch **174**, in a direction to roll the pinions **39** forwardly along their racks **40** until the lever rollers **75** engage the abutments **77** at the forward ends of their recesses **74**. The motor **111** controlling the seat adjusting screw **102** is also operated, if necessary, to lower the seat **42** to its lowermost adjusted position on the seat support **34**, which, as explained previously herein, brings the seating surface thereof to a comfortable height for seating oneself in the chair.

After a patient has been seated in the chair A, the seat **42** is elevated, by means of its adjusting screw **102** to bring the patient's head comfortably within the head rest **44**. The motors **91** and **153** are then operated simultaneously, by actuation of their common control switch **176**, to tilt the seat support **34** rearwardly to a desired angle of inclination. This action, as mentioned previously herein simultaneously swings the leg rest **45** upwardly, proportionately to the angle of inclination of the seat support. The consoles **35**, together with the seat support **34** and associated parts, may then be elevated to a desired height by actuating the elevating motor **59**, by means of its switch **173**. The seat support **34** may also be transported to a desired position along the tracks **37** and **38** by actuation of the motor **87**, by means of its switch **174**, to drive the transport pinions **39** along their racks **40**.

Full selective control of the various motors is provided by their respective, normally, off reversing switches, which permit any or all of the motors to be operated in their direction at will. Each patient thus may be easily and quickly positioned in a comfortable attitude, and at a desired height, fore and aft position, and angle of inclination for each dentist using the chair, while the consoles move vertically with the patient to insure maximum availability of the equipment mounted thereon.

Upon completion of an operative procedure, the seat **42** is again brought to its lowermost, upright, forwardly transported position to facilitate exit of the patient from the chair. This also leaves the chair in proper position for the seating of the next patient therein.

The arm rests **47** may be swung inwardly or extended forward to any desired position merely by the natural movement of a patient's arms resting thereon, while the control knob **142** permits the patient to control radio or recorded music available through the earphones **143** in the head rest.

The operation of the various implements and equipment provided on the consoles **35** will be obvious to any dentist and dental nurse, and will be used in the customary manner, except that their operation will be more convenient and efficient due to the ability of the dentist to fully control the position of both the patient and the consoles.

The invention provides an improved dental operative chair, wherein each patient can be positioned with his head fitted comfortably into a fixed head rest, regardless of the size of the patient, and may be tilted and transported bodily relative to the operative consoles, and both the consoles and the patient can be raised or lowered as desired. All of these features make for maximum efficiency, and tend to reduce fatigue on the part of the dentist.

While I have illustrated and described a preferred embodiment of the present invention, it will be understood, however, that various changes and modifications may be made in the details thereof without departing from the scope of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to protect by Letters Patent is defined in the following claims:

1. A dental chair comprising

(a) a base frame,

(b) a pair of upright side frames mounted in laterally spaced relation on the base frame,

(c) a seat support comprising an elongated back portion mounted between the side frames for selective upward, downward, forward and rearward bodily movement, and for forward and rearward tilting movement,

(d) a head rest mounted on the upper end of the back portion of the seat support,

(e) a seat member having a short back portion mounted on the back portion of the seat support for travel lengthwise thereof, and

(f) power drive means for selectively moving the seat support bodily upwardly, downwardly, forwardly and rearwardly, for tilting the seat support between a forward position wherein the back portion thereof is substantially upright and a rearward position wherein the back portion thereof is inclined at a substantial angle from upright condition, and for traversing the seat lengthwise along the back portion of the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

2. A dental chair comprising

(a) a base frame,

(b) a pair of upright side frames mounted in laterally spaced relation on the base frame,

(c) a combined console and track frame mounted for vertical adjustment on each side frame,

(d) a horizontal track on each console and track frame,

(e) a seat support comprising an elongated back portion mounted on said tracks for forward and rearward bodily movement therealong, and for forward and rearward tilting movement relative thereto,

(f) a head rest mounted on the upper end of the back portion of the seat support,

(g) a seat member having a short back portion mounted on the back portion of the seat support for movement lengthwise thereof, and

(h) power drive means for selectively moving console and track frames bodily upwardly and downwardly, for moving the seat support forwardly and rearwardly along the tracks, for tilting the seat support between a forward position wherein the back portion thereof is substantially upright, to a rearward position wherein the back portion thereof is inclined at

a substantial angle from upright condition, and for moving the seat lengthwise along the back portion of the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

3. A dental chair comprising

(a) a frame,

(b) a seat support comprising an elongated back portion mounted on the frame for selective upward, downward, forward and rearward bodily movement, and for forward and rearward tilting movement,

(c) a head rest mounted on the upper end of the back portion of the seat support,

(d) a seat member having a back portion substantially shorter than the back portion of the seat support and mounted on the seat support for travel lengthwise of the back thereof, and

(e) power drive means for selectively moving the seat support bodily upwardly, downwardly, forwardly and rearwardly, for tilting the seat support between a forward position wherein the back portion thereof is substantially upright, and a rearward position wherein the back portion thereof is inclined at a substantial angle from upright condition, and for traversing the seat lengthwise of the back portion of the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

4. A dental chair comprising

(a) a base,

(b) a pair of vertically adjustable combined console and track frames mounted in laterally spaced relation on the base,

(c) a horizontal track on each console and track frame,

(d) a seat support mounted on said tracks for forward and rearward bodily movement therealong, and for forward and rearward tilting movement relative thereto,

(e) a head rest mounted at a substantial height on the seat support,

(f) a seat member having a short back portion mounted on the seat support for movement up and down thereon,

(g) power drive means for selectively moving the console and track frames bodily upwardly and downwardly, for moving the seat support forwardly and rearwardly along the tracks, for tilting the seat support between a forward position wherein the back portion thereof is substantially upright, to a rearward position wherein the back portion thereof is inclined at a substantial angle from upright condition, and for moving the seat up and down on the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

5. A dental chair comprising

(a) a base,

(b) a pair of upright side frames mounted in laterally spaced relation on the base,

(c) a jack screw mounted vertically in each side frame,

(d) a combined console and track frame mounted for vertical adjustment on each side frame,

(e) a threaded member on each console and track frame in threaded engagement with one of the jack screws,

(f) reversible drive means operatively connected to the jack screws for selectively raising and lowering the console and side frames in unison,

(g) a horizontal track on each console and track frame,

(h) an L-shaped seat support comprising an elongated back portion and a lower portion at substantially right angles thereto mounted on said tracks for forward and rearward bodily movement therealong, and for forward and rearward tilting movement relative thereto,

(i) reversible drive means for selectively moving the seat support along the tracks,

(j) reversible drive means for tilting the seat support from upright to rearwardly inclined position,

(k) a head rest mounted on the upper end of the back portion of the seat support,

(l) a seat member having a short back portion mounted for movement lengthwise along the back portion of the seat support, and

(m) reversible drive means for selectively moving the seat lengthwise along the back portion of the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

6. A dental chair comprising

(a) a frame,

(b) a seat support mounted on the frame for selective upward, downward, forward and rearward bodily movement, and for forward and rearward tilting movement,

(c) a head rest mounted on the upper end of the seat support,

(d) a seat member mounted on the seat support for travel upwardly and downwardly thereon, and

(e) power drive means for selectively moving the seat support bodily upwardly, downwardly, forwardly and rearwardly, for tilting the seat support forwardly and rearwardly, and for elevating and lowering the seat on the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

7. A dental chair comprising

(a) a frame,

(b) a pair of side frame elements on the frame and spaced apart to receive a seat support therebetween,

(c) a track frame mounted for vertical adjustment on each side frame element,

(d) a horizontal track on the inward side of each track frame,

(e) a seat support mounted for forward and rearward traversing adjustment on the tracks,

(f) means for tilting the seat support forwardly and rearwardly to adjusted position, and

(g) a seat member mounted on the seat support for upward and downward adjustment thereon.

8. A dental chair comprising

(a) a base,

(b) a pair of upright side frames mounted in laterally spaced relation on the base,

(c) a vertical track means in each side frame

(d) a jack screw mounted vertically in each side frame,

(e) a combined console and track frame mounted between the side frames and riding on the vertical track means and operatively connected to each jack screw for vertical adjustment thereby,

(f) a pair of laterally opposite horizontal tracks, one on each console and track frame,

(g) a seat support comprising an elongated back portion and a lower portion at substantially right angles thereto, rotary support means at the forward and rearward ends of the seat support lower portion and mounted for rolling movement along said tracks,

(h) reversible drive means for selectively moving the seat support along the tracks,

(i) means for tilting the seat support from upright to rearwardly inclined position,

(j) a head rest mounted on the upper end of the back portion of the seat support,

(k) a seat member mounted for upward and downward movement along the back portion of the seat support, and

(l) reversible drive means for moving the seat to a selected position along the back portion of the seat support to position on the head rest the head of a person of any height within a selected maximum and minimum when such person is seated on the seat.

9. A dental chair comprising

(a) a frame,

(b) a pair of side frame elements on the frame and spaced apart to receive a seat support therebetween,

(c) a track frame mounted for vertical adjustment on each side frame element,

(d) a console mounted on each track frame for movement therewith,

(e) a horizontal track on the inward side of each track frame,

(f) a seat support mounted for forward and rearward traversing adjustment on the tracks,

(g) means for tilting the seat support forwardly and rearwardly to adjust position, and

(h) a seat member mounted on the seat support for upward and downward adjustment thereon.

10. A dental chair comprising

(a) a frame,

(b) a pair of side frame elements on the frame and spaced apart to receive a seat support therebetween,

(c) a track frame mounted for vertical adjustment on each side frame element,

(d) a horizontal track on the inward side of each track frame,

(e) an L-shaped seat support one leg thereof comprising an upwardly extending back portion and the other leg thereof extending forwardly from the lower end of the back portion,

(f) rotary means mounted at the forward and rearward portions of said other leg of the seat support and operatively engaging the tracks for supporting the seat support for forward and rearward traversing adjustment on the tracks,

(g) means for tilting the seat support forwardly and rearwardly to adjusted position, and

(h) a seat member mounted on the seat support for upward and downward adjustment thereon.

11. An arrangement according to claim **10** wherein the seat tilting means comprises a pair of power driven levers, mounted one at each side of the forward portion of said other leg of the seat support, each lever having journal support means at its free end upon which the rotary means at the forward portion of said other leg of the seat support are journaled for free rolling movement along their respective tracks.

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