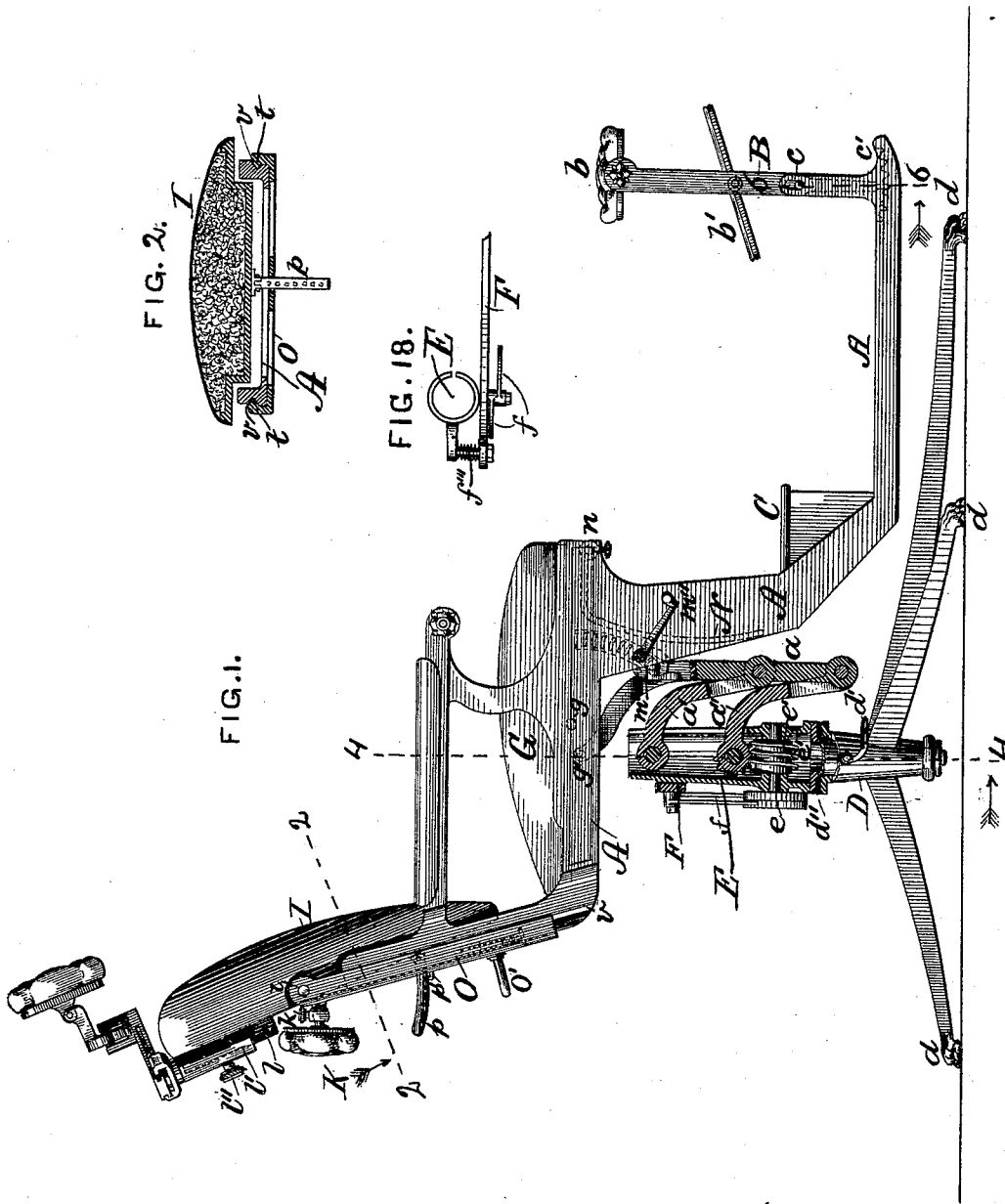


B. M. WILKERSON.
DENTAL CHAIR.

3 Sheets—Sheet 1.

No. 478,672.

Patented July 12, 1892.



WITNESSES:

Baltus DeLoof,
Wm. J. Peyton.

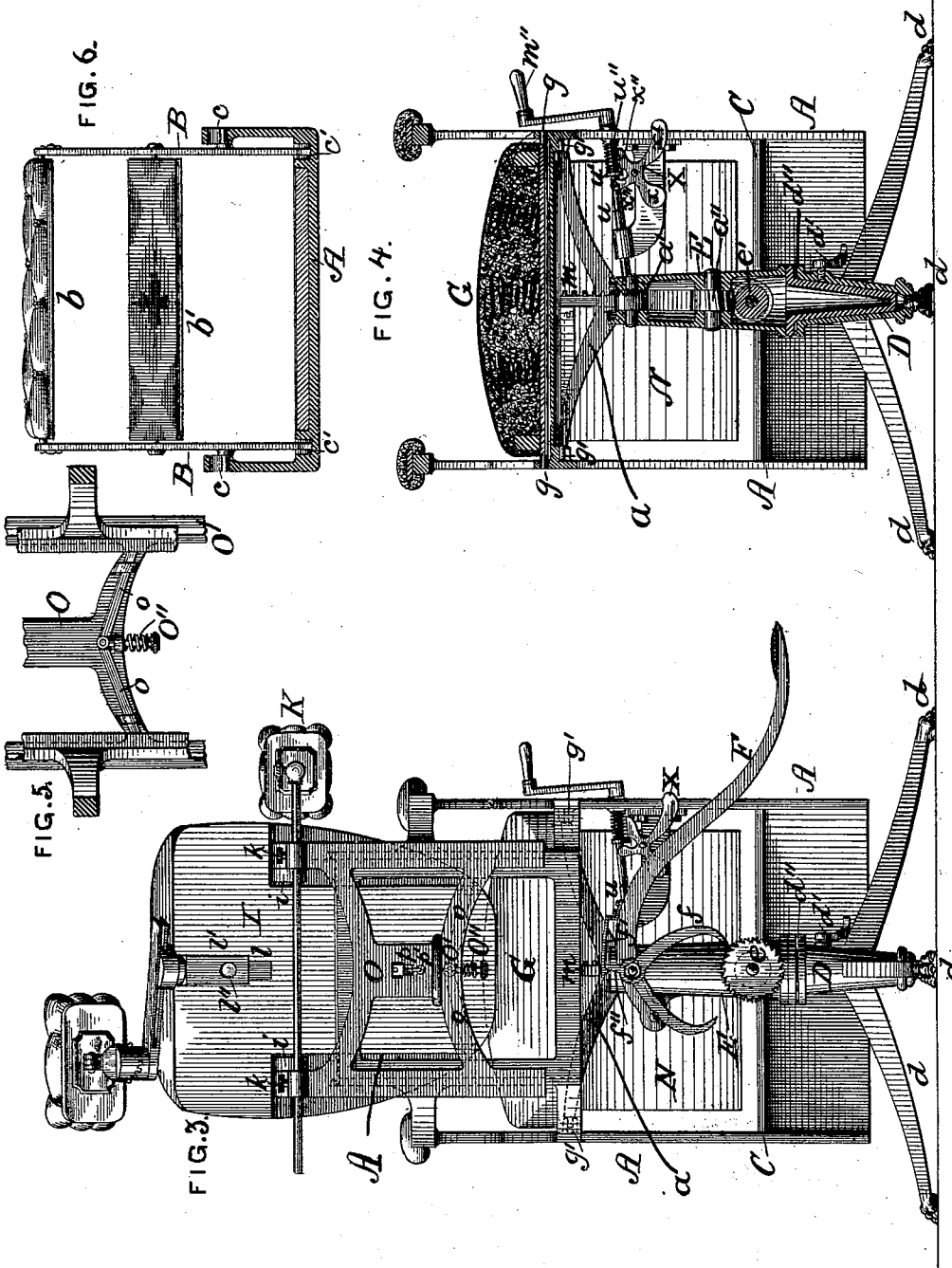
INVENTOR:

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by his attys
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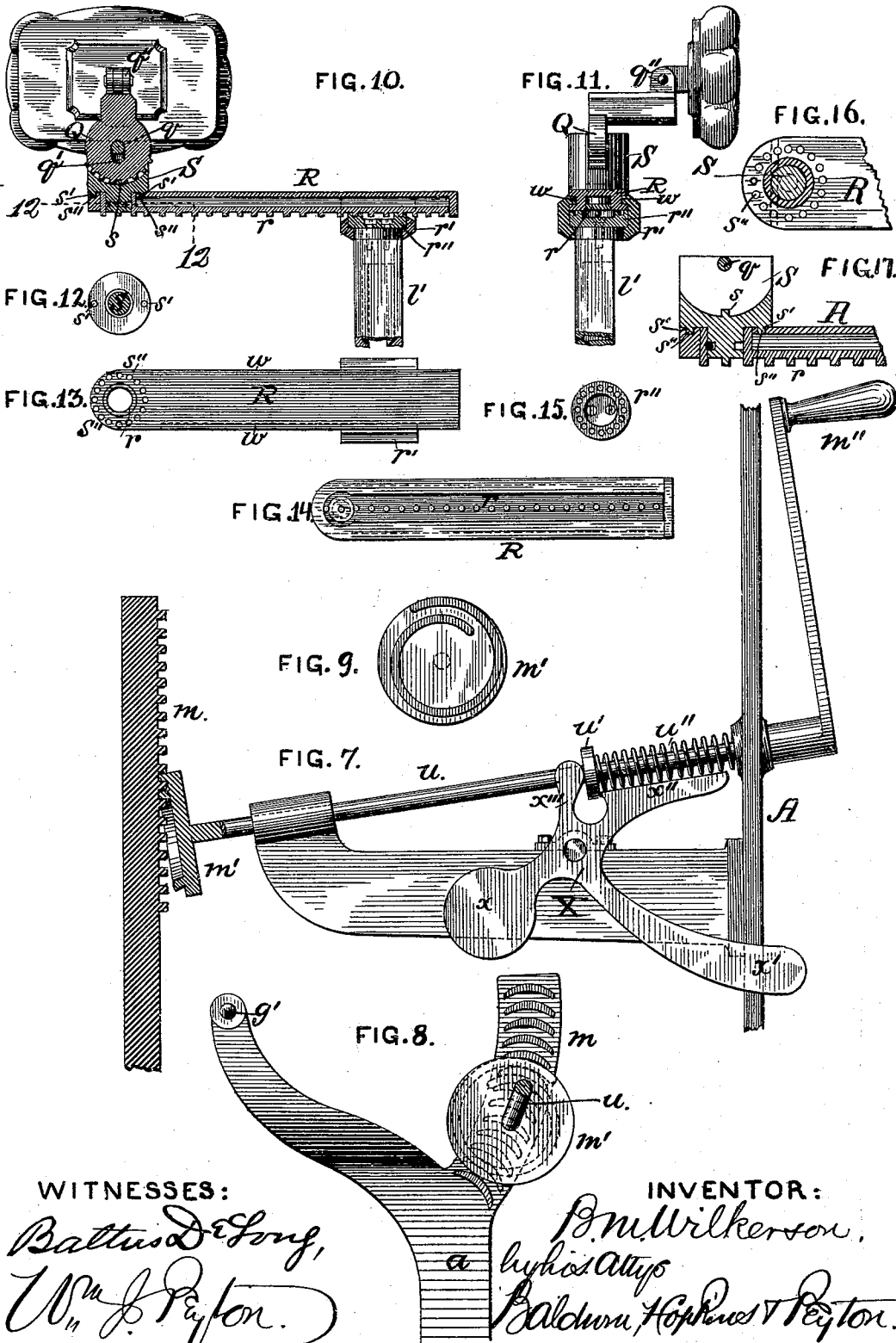
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INVENTOR:

B. M. Wilkerson,
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UNITED STATES PATENT OFFICE.

BASIL M. WILKERSON, OF BALTIMORE, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 478,672, dated July 12, 1892.

Application filed December 21, 1877.

To all whom it may concern:

Be it known that I, BASIL M. WILKERSON, of the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Dental Chairs, of which the following is a specification.

This invention relates to improvements applicable to that class of chairs in which it is a desideratum that the chair-body shall be capable of being elevated or lowered and revolved; and the said invention consists in certain details of construction and of certain new organizations of devices and combinations of parts, as hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation of my improved chair, partly in section as to the elevating and supporting mechanism. Fig. 2 is a transverse section through the chair-back on the line 2 2 of Fig. 1, showing more particularly the manner of constructing said back and of fitting its adjusting frame or casting upon the frame of the chair. Fig. 3 is a rear elevation of the improved chair. Fig. 4 is a vertical section through said chair on the line 4 4 of Fig. 1, looking toward the foot-rest of the chair. Fig. 5 is a front view of a portion of the sliding-back frame and the chair-frame, with the upholstering of the back shown in Fig. 2 removed, illustrating more particularly the knee-joint-locking device by which said sliding-back frame is locked to the chair-frame when vertically adjusted. Fig. 6 is a view of the foot and leg rest, the frame of the chair at the front end being in vertical section on the line 6 6 of Fig. 1. Fig. 7 is an enlarged view, in elevation, of the tilting or inclining mechanism of the chair, the curved rack-bar and the scroll cam-wheel of said tilting mechanism being in section. Fig. 8 is a side view of a portion of the chair-frame supporting or carrying bar and of said tilting or inclining mechanism, and Fig. 9 is a face view of the scroll cam-wheel of said tilting or inclining mechanism. Figs. 10 to 17, inclusive, are detail views of the improved head-rest supporting and adjusting devices, Figs. 16 and 17 being on an enlarged scale and plainly showing the connection between the adjustable column

and link, providing for the turning of the column in the link, and adapting the column and supplemental bar of the link to be vertically moved together. Fig. 18 is a plan view showing a portion of the lever for raising and lowering the chair, its lifting-spring, &c.

In Letters Patent of the United States No. 197,441, granted to me November 20, 1877, I have described at length a dental chair, upon which invention the present one is in certain respects an improvement. I do not, therefore, consider it either necessary or desirable to give here a detailed description of various features which the two inventions possess in common.

To a hollow pedestal D are secured in any convenient manner legs *d d d*, the latter being arranged, preferably, as described in my patent, No. 197,441, the front leg in the present case being, however, made somewhat longer than the others, as shown. The main support E for the chair frame or body is mounted upon the pedestal and revolves freely upon the bearing *d''*, its revolution being normally prevented by means of the screw *d'*, provided with a handle, and which bears upon the part of the support within the pedestal. The elevation of the screw-handle disengages the screw and permits the rotation of the chair-body when desired. Within the support E is journaled the worm *e'*, and upon its shaft, exterior to the support, is keyed the double ratchet-wheel *e*. Above the worm *e'* and also within the support are pivoted the parallel pivot-arms *a' a''*, the end of the latter being furnished with teeth which mesh with the worm *e'*. To a bearing upon the support E is jointed the foot-lever F, to which is pivoted a double pawl *f*, adapted to engage with the ratchet-wheel *e*. As the lever is fulcrumed independently of the ratchet-shaft and eccentrically to the ratchet, the pivot of the pawl—its jointed connection with the lever—is caused to approach and recede from the ratchet as the lever rocks. The pawl is extended above the pivot, forming a point *f''*, upon which the spring-arm *f'*, attached upon the upper side of the foot-lever, is arranged to bear. It will be observed (see Figs. 1 and 3) that the two arms of the pawl do not lie in

the same plane, but are adapted to engage each with its part of the double ratchet *e*, the teeth of which upon one of its halves point in an opposite direction to those upon the other. The spring-arm *f'* serves to cause the pawl to gear with either desired half of the wheel, but admits of its being readily reversed by lifting the outer end of the arm and adjusting the pawl-point to the inner or outer side of the downwardly-projecting end lug of the arm. By mounting the pawl-carrying lever eccentrically to the ratchet, as shown, it is obvious that the pawl is moved bodily in the direction of the ratchet when the lever descends and in the opposite direction when the lever rises, the result being that by proper adjustment of the reversible pawl the ratchet may be turned in either direction by movement of the lever in one direction—downwardly. The ends of the arms *a' a''* exterior to the support are securely pivoted to a vertically-adjustable chair-supporting bar *a*, the pivots being exactly as far apart as the bearings within the support. The bar *a* is bifurcated, as shown in Figs. 1, 3, and 4, its upper ends forming journals *g' g'*, upon which the chair frame or body proper *A* is mounted. To tilt or rock the chair-frame about its supporting-bar by means of gearing, a curved rack *m* is secured to the bar *a*, as shown in Figs. 1 and 8, with which rack a scroll-faced wheel *m'*, driven by means of the crank *m''*, engages. The details of construction and operations of these parts will be hereinafter referred to. A spring *f'''* (see Fig. 18) is provided to act upon the lever *F* near its pivot and serves to recover the lever after each downward stroke.

The frame *A* is extended forward of the seat, as shown, so as to form the usual platform or foot-board, its extremities on either side being provided with racks *c'*. A suitable foot-rest *b'* is secured between standards *B*, relatively to which it is stationary, and these standards are pivoted to the ends of the chair-frame in slotted bearings *c*, the lower ends of the standards *B* engaging with the notches of the racks *c'*. Between the upper ends of the standards a rocking leg-rest *b* is pivoted and turns freely within certain limits upon its bearings. By slightly raising the leg-rest the ends of the standards are brought out of engagement with the racks *c'*, when the rest may be adjusted to or from the chair-seat to suit the convenience of the occupant of the chair.

The frame *A* is provided with the foot-rest or step *C*, as shown in my patent, No. 197,441, the front plate *N* being inclined rearwardly, as shown in that patent. The plate *N* in this case is pivoted at *n*, being held in its normal position by a set-screw, as shown in Fig. 1, and is adapted to be turned over upon the chair-seat when desired. The object of this construction is to protect the upholstering of the seat when a supplemental or child's seat is in use, in which case the chair-seat

proper *G* becomes a foot-rest for the occupant of the chair.

The chair-seat is pivoted centrally, or nearly so, at *g*, as shown in my patent above referred to.

The sides of the frame at the back are each furnished with guideway-grooves *v*, in which tenons *t t* upon the movable back-support *O* slide. The chair-frame rocks or tilts upon the bearings *g' g'*, its angle of inclination being adjusted by means of the mechanism shown in Figs. 1, 3, 4, 7, 8, and 9. The gear-rack *m*, as before stated, is secured to the bar *a*, being curved in the arc of a circle, of which the axis of the journals *g' g'* is the center, as shown in side elevation. The scroll gear-wheel *m'* is secured to the revolving shaft *u*, which has its bearings in the side of the chair-frame. The shaft is adapted to move endwise in its bearing to disconnect the gearing *m m'*, being provided with a collar *u'*, between which and the inner side of the chair-frame a spiral spring *u''* is placed, serving to hold the wheel *m'* normally in gear with the rack *m*. An armed rocking plate formed by a casting *X* is pivoted to a bearing attached to the chair-frame. The rocking plate has four arms *x x' x'' x'''*. The first of these *x* is a counterpoise designed to hold the device in the position shown in Fig. 7. The second *x'* is a foot or hand lever for the operator. The third *x''* is a lug, which enters between the chair-frame and collar *u'*, and serves to hold the wheel in gear, and the fourth *x'''* is another lug, preferably made double in order to embrace the shaft-bearing upon the opposite side of the collar *u'*, when the lever or foot-hold *x'* is depressed, compressing the spring *u''* and sliding the shaft in its bearings, thus throwing the wheel out of gear. The object of this mechanism is to throw the wheel suddenly out of gear when it is desired to rapidly alter the angle of inclination of the chair-body by a direct application of force.

A casting constituting the back-support *O*, Figs. 1, 2, 3, and 5, slides, as before explained, upon the back of the chair-frame and carries the chair-back *I*, which is pivoted at *i i*. A pair of arms *o o*, pivoted together, as shown, and forming a knee-joint, are normally thrust outward by means of a spring *O''* against the sides of the chair-frame, preventing motion of the sliding back. A handle *O'*, attached to the back-support, serves as a hand-hold for raising and lowering it. In lowering the spring *O''* is compressed by thrusting upward the rod about which, between its head and a guideway in which it slides, the spring is coiled. This rod is connected with the knee-joint arms sliding in guideways, as shown plainly in Fig. 5.

The back *I* is pivoted centrally, or nearly so, whereby it adjusts itself to the position assumed by the occupant of the chair and carries a pivoted curved perforated bar *p*, which passes through a slot in the back-support *O*. A small detent-bolt *p'* on the back-

support and adapted to enter any desired one of the holes in the bar *p* serves to retain the back in the position to which it is brought by tilting at *i i*.

5 An upholstered pad *K* is attached by a ball-and-socket joint to an endwise-movable rod, which passes through holes or bearings in the upper ends of the sides of the back-support casting *O*. Set-screws *k k* serve to
10 clamp the rod in its bearings to secure the pad at any desired distance from the chair. The object of this feature is to furnish a shoulder-rest or side-support for the operator during tedious operations and obviate the in-
15 convenience and discomfort incident upon bearing against the corner of the chair.

A dovetail rib *l* is secured to the movable back *I* and is embraced by a conversely-formed vertically adjustable or sliding head-
20 rest-supporting bar *l'*, through which a set-screw *l''* passes and constitutes a handle for raising the head-rest and serves to secure it at any desired height. A countersunk circular or disk-like head *r''* is attached upon the
25 upper end of the head-rest-supporting bar *l'* by means of screws or otherwise and is provided near its edge upon its upper surface with a circular line of holes. A hollow trough-like bar *R* slides upon the head *r''*, being
30 guided and retained by the guide-piece *r'*, turning about the bar *l'* and having tenons which enter slots *w w* in the sides of the bar *R*. Within the hollowed under side of the bar *R* is arranged a supplemental bar *r*, hav-
35 ing on its under side a series of teeth adapted to enter the perforations in the head *r''*. A similar series of perforations *s''* is formed in the upper side of the bar *R* at its outer end, into which teeth *s'* on the under side of
40 the column *S* fall. Within this column is mounted, so as to rock upon a pivot *q*, a lug *Q*, the perforations *q'* therein for the pivot being elongated, as shown. The bottom of the seat for the rocking lug formed in the
45 column *S* by the slot thereof, in which the lug is pivoted, is curved in the arc of a circle, and the lug is correspondingly curved and formed on its under side with a series of teeth. A single tooth *s* is provided in the bottom of the slot
50 or lug-seat in the column *S*. The rocking lug projects downwardly from one end of an arm in bearings *q''*, at the opposite end of which a head-rest pad is mounted, so as to rock about a horizontal axis. The column, while having
55 no vertical movement independently of the supplemental bar of the head-rest link, is adapted to be turned about its vertical axis in the link. A round stud or journal at the base of the column is mounted in the link
60 within a bearing-sleeve or tubular boss of the supplemental bar thereof. An annular groove in this journal is engaged by a pin with the boss, and the main bar of the link is bored through transversely for insertion and re-
65 moval of this pin.

From the foregoing description it will be evident that the chair-body and its attach-

ments may be readily elevated or lowered by actuating the wheel *e'* through the medium of the lever *F*, pawl *f*, and ratchet *e*. As the
70 bar *a''* turns about its pivot, the chair-body is raised or lowered in the arc of a circle, and, owing to the friction of the mechanism, no means are required for securing the chair-body at any attained elevation.
75

The foot and leg rest, being adjustable to and from the chair-seat, may be made to suit the convenience of the patient, and the leg-
80 rest, being pivoted and swiveling freely, is perfectly self-adjusting.

I have shown no child's seat in the present case for use in connection with the front plate *N*, nor thought it necessary to do so. Such a device for this purpose, as described in detail
85 in my former patent, No. 197,441, may be employed, or a simple upholstered seat or board may be placed upon the arms of the chair.

The seat proper is centrally pivoted to admit of adjustment, and the back *I* is similarly
90 attached and for the same purpose.

The side-rest *K* will be found particularly convenient to dentists, as it obviates what has been a source of annoyance and even
95 positive pain to the operator. It further serves as a brace, and, as described, is adjustable to or from the chair, and, like the seat, leg-rest, and back, may be freely tilted.

The head-rest may be inclined about a horizontal axis by simply lifting the lug *Q* until the tooth *s* is disengaged, turning the lug, as
100 desired, and allowing the tooth *s* to enter the appropriate notch of the lug as it is released.

In order to rotate the head-rest about the vertical axis of the column *S*, it is only necessary to lift the column until the teeth *s'* are
105 disengaged, rotate it to the desired point, and release it when the teeth drop back into the holes *s''* opposite and retain the parts securely in the assumed position. In order to rotate the head-rest about the axis of the bar
110 *l'*, the column *S* is lifted, carrying with it the supplemental bar *r* and disengaging its teeth from the holes in the head *r''*. The duplex link, formed by the bars *R* and *r*, now may be rotated, or, if desired, the column *S* may
115 be made to approach the bar *l'* by sliding the two-part link, so as to adjust the radius of rotation to any desired length. An important advantage secured in my head-rest is that
120 it requires no mechanism for securing its parts after adjustment other than that which automatically accomplishes that end. Upon releasing the parts they secure themselves. While not so shown the teeth and holes may
125 be made tapering, respectively, at the points and orifices, in order to facilitate this automatic securing of the parts. It will be seen that various parts of the chair—such as the leg-rest, seat, back, and head-rest pad—rock
130 freely about practically-central axes.

I claim as my invention—

1. The combination, substantially as set forth, of the main support, the chair-frame, its supporting-bar, the arms pivoted at their

inner and outer ends at corresponding distances apart to the main support and supporting-bar, respectively, and means for operating the arms, whereby the chair-frame
5 may be raised or lowered by rocking said arms about their pivotal connections with the main support.

2. The combination, substantially as set forth, of the main support, the chair-frame,
10 its supporting-bar, the arms pivoted at their inner and outer ends at corresponding distances apart to the main support and supporting-bar, respectively, one of said arms being provided with gear-teeth at its inner
15 end, the worm engaging said teeth, and the worm-shaft mounted in bearings of the main support and projecting at one end therefrom to adapt it to be acted upon for turning the worm in either direction to raise or lower the
20 chair-frame.

3. The combination, in a dental chair, of the main support, the worm, its shaft mounted in bearings of the main support, the reversely-toothed double ratchet on the worm-shaft,
25 the lever fulcrumed on the main support eccentrically to said ratchet, and the reversible double pawl carried by the lever for actuating the ratchet to rotate it in either direction by downward movement of the lever, substantially as and for the purpose set forth.
30

4. The combination of the worm, its shaft, the support, in bearings of which the shaft is mounted, the two-part ratchet of said shaft, the reversible pawl having the point at top,
35 the lever pivoted to said support eccentrically to the ratchet and to which the pawl is pivoted, the adjustable arm of the lever acting on the pawl-point, and a spring for elevating the lever, substantially as and for the purpose set forth.
40

5. The combination of the tilting chair-frame, the vertically-adjustable supporting-bar to which it is pivoted and by way of which it is entirely supported, the separable
45 gearing connecting the chair-frame, and supporting-bar for tilting said chair-frame about its pivotal connection with the supporting-bar, and means for disconnecting said gearing, whereby the chair-frame may be tilted
50 gradually by the gearing when in mesh or rapidly by direct application of force when the gearing is disconnected, substantially as set forth.

6. The combination of the chair-frame platform provided at its extremities on either side
55 with racks and above said racks with slotted bearings and the foot-rest standards engaging at their lower ends with said racks and having pivots adapted to rock in and move lengthwise of said slotted bearings, substantially as and for the purpose set forth.
60

7. The combination, in a dental chair, of the chair-seat frame, the upholstered seat, and the plate pivoted to the lower front portion
65 of the seat-frame, shaped to correspond with the front and upper surfaces of the upholstered seat, and adapted to fold over upon said seat, substantially as and for the purpose set forth.

8. The combination of the head-rest-supporting bar having the disk-like head at top provided upon its upper surface with the circularly-arranged perforations, the guide-piece turning about the supporting-bar, and the two-part sliding and turning link, one member
75 of which is movable vertically relatively to the other and is provided with teeth for engaging the holes in the head of the supporting-bar, substantially as and for the purpose set forth.
80

9. The combination of the vertically-movable head-rest column provided with teeth on its under side, and the link in which the column is fitted to turn, provided upon the upper surface of its outer end with the circular
85 row of holes for engagement with the teeth on the under side of the column, substantially as and for the purpose set forth.

10. The combination of the head-rest, the arm at one end of which it is mounted, the curved toothed lug at the opposite end of
90 said arm, the column having the lug-seat curved at bottom and provided with a tooth, and the pivotal connection between said lug and column permitting of vertical and rocking movement of the lug in its seat in the column, substantially as and for the purpose set forth.
95

Witness my hand this 20th day of December, 1877.

BASIL M. WILKERSON.

Witnesses:

R. D. WILLIAMS,
W. A. BERTRAM.