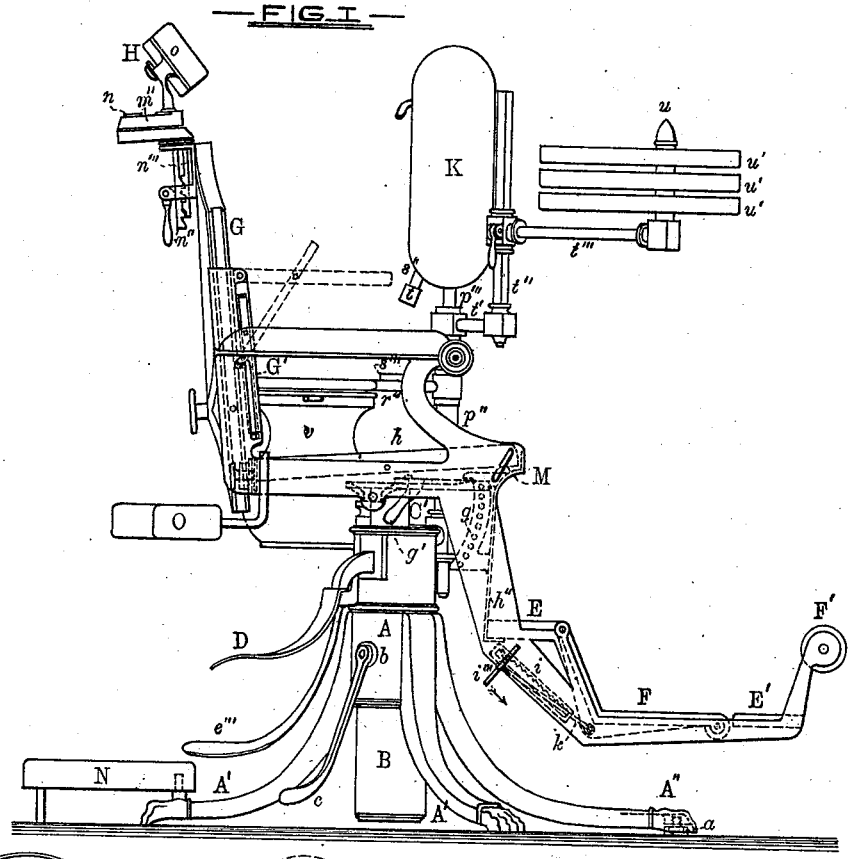
4 Sheets—Sheet 1

B. M. WILKERSON.

Dentist's Chairs.

No. 197,441. Patented Nov. 20, 1877.

FIG. I.



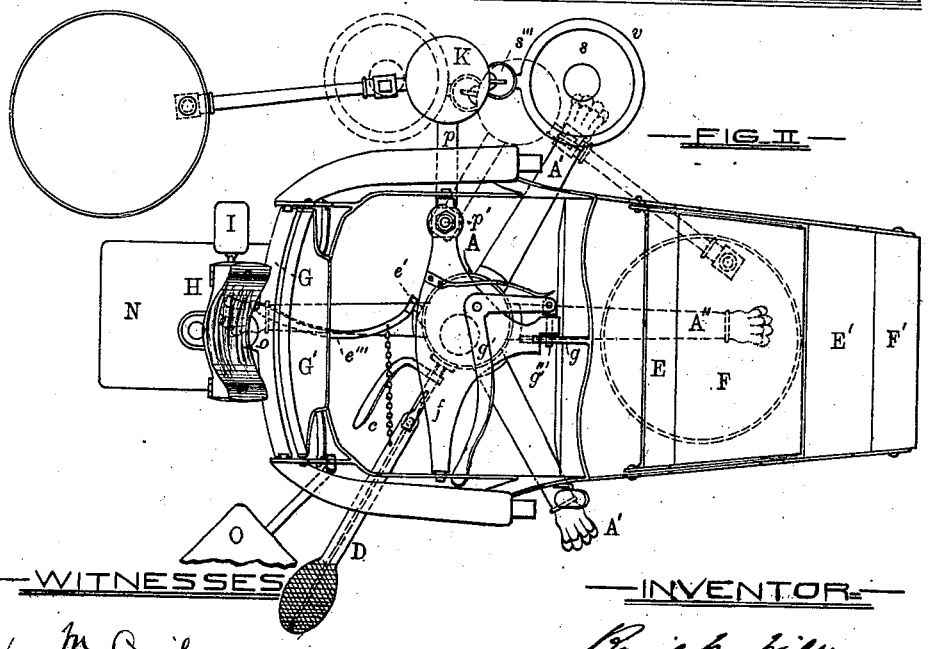


FIG. II.

WITNESSES

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4 Sheets—Sheet 2.

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FIG. III

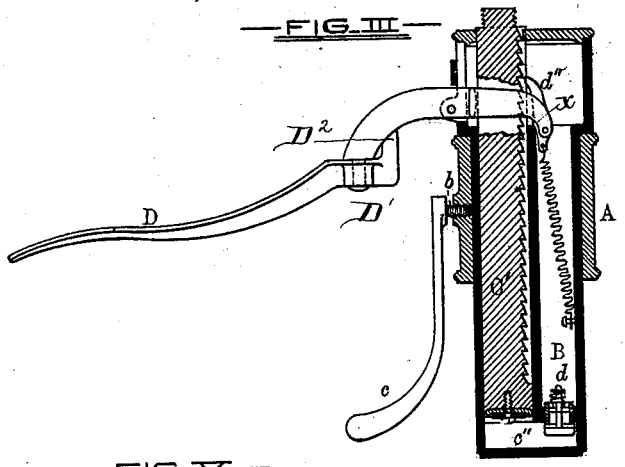


FIG. IV

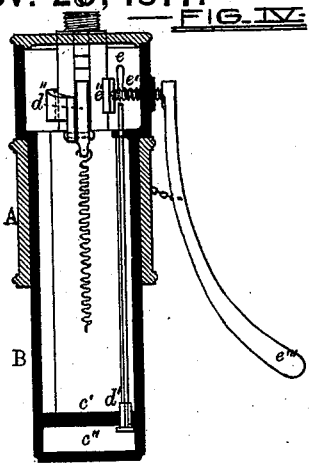


FIG. V

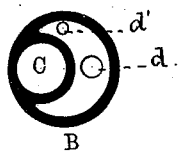


FIG. VI

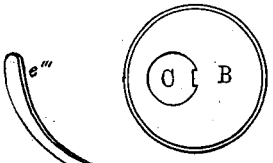


FIG. VIII

FIG. IX

FIG. VII

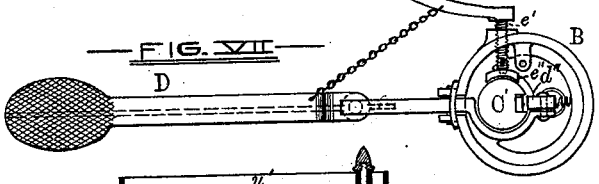
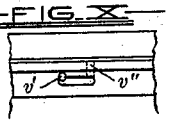
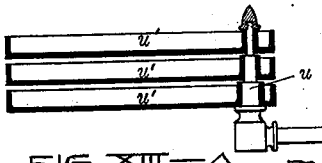


FIG. X





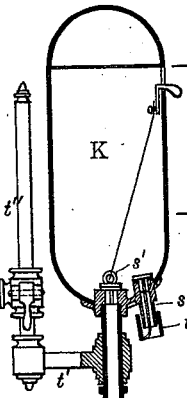
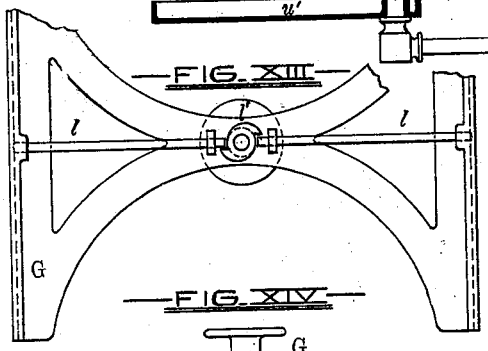


FIG. XI

FIG. XIII



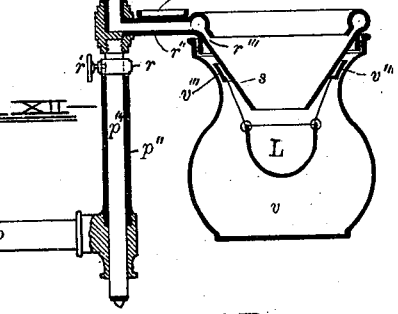


FIG. XIV

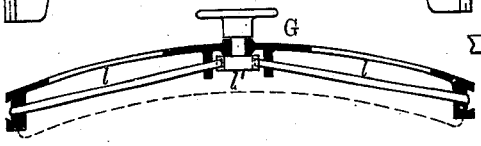
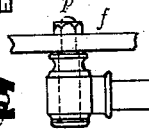


FIG. XII



WITNESSES.

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B. M. WILKERSON.

Dentist's Chairs.

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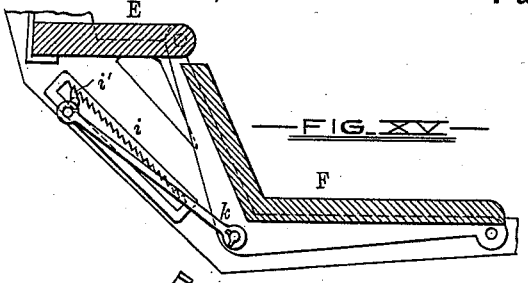


FIG. XV.

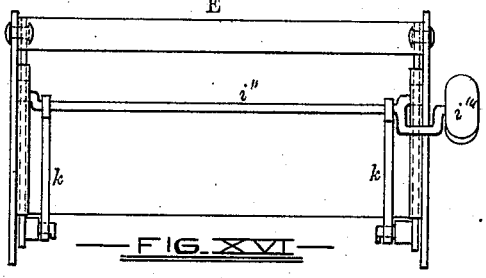


FIG. XVI.

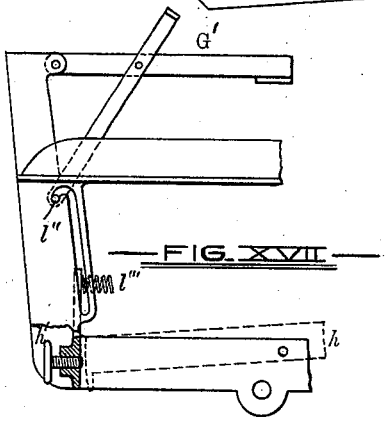


FIG. XVII.

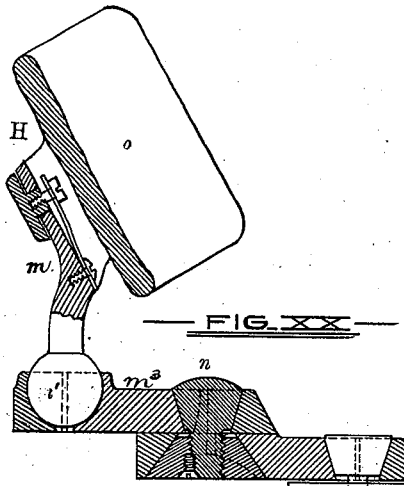


FIG. XX.

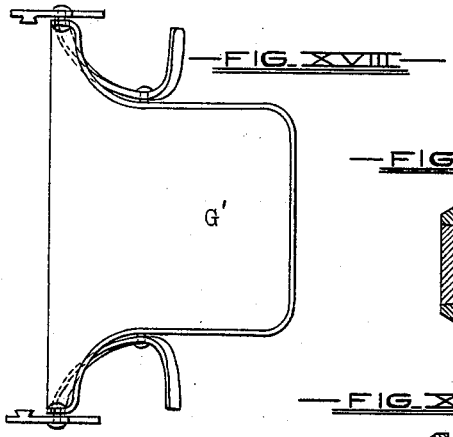
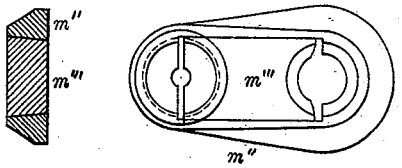


FIG. XVIII.

FIG. XXI. FIG. XXII.



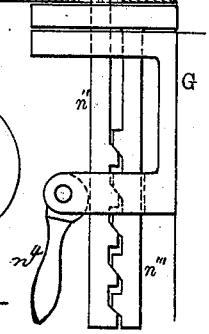


FIG. XXIII. FIG. XXIV.

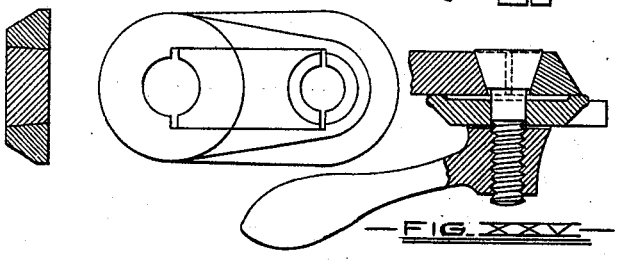


FIG. XIX.

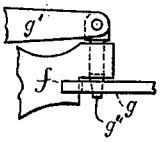


FIG. XXV.

WITNESSES

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4 Sheets—Sheet 4.

B. M. WILKERSON.

Dentist's Chairs.

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FIG. XXVI.

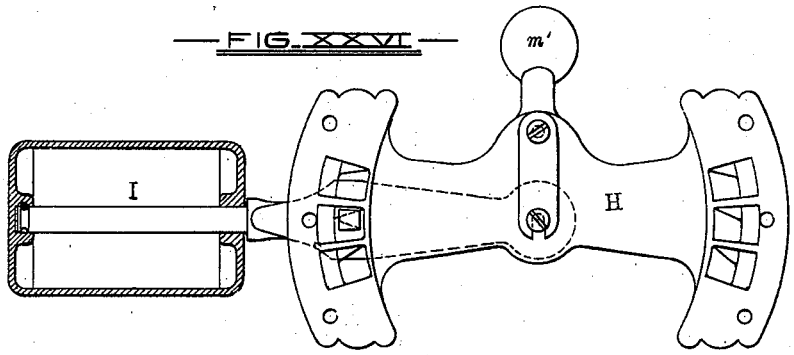
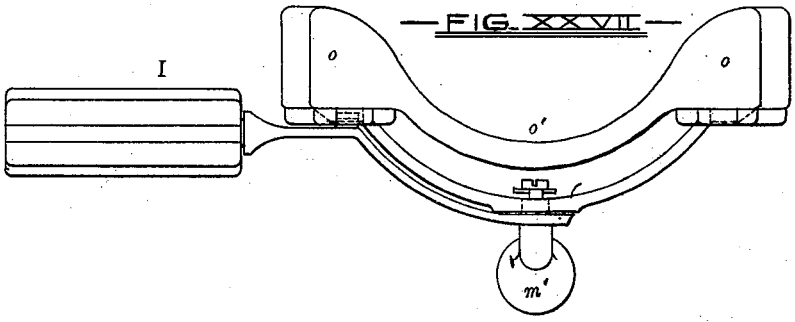


FIG. XXVII.



WITNESSES.

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UNITED STATES PATENT OFFICE.

BASIL M. WILKERSON, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN DENTISTS' CHAIRS.

Specification forming part of Letters Patent No. **197,441**, dated November 20, 1877; application filed April 17, 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; and I hereby declare the same to be fully, clearly, and exactly described as follows, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved chair; Fig. 2, a plan view of the same, having the chair-seat removed. Figs. 3 to 27, inclusive, represent enlarged views of various parts of the chair.

Similar letters of reference indicate similar parts in all the figures.

This invention relates, as stated, to dental chairs; and it consists in certain details of the same, and combinations of parts not here necessary to enumerate, as they are hereinafter made the subjects of claims based upon the following description.

A represents a hollow cylindrical pedestal, supported, preferably, upon three legs, A′, projecting radially therefrom, and a fourth leg, A″, the foot of which is raised slightly above the plane of the remaining three feet, and is provided with a screw, *a*, on the under side, which is raised or lowered, as the case may be, in order to adjust the chair to suit irregularities in the floor. These legs are arranged as indicated in the drawings, the leg A″ projecting toward the front, and being designed to prevent the tilting forward of the chair as the patient steps upon the foot-board, while the adjacent legs A′, on either side, project forward of the median line of the chair in order to be out of the way of the feet of the operator. The back leg A′ extends centrally to the rear. By this arrangement of the legs a large space is left on each side of the central back leg free to be used, without obstruction or hinderance, by the operator, who, heretofore, during his work, has frequently been impeded and annoyed by the legs, which, in ordinary chairs, extend from the corners of the chair.

B represents a cylindrical liquid-reservoir, constructed to rest and turn within the pedestal A. A set-screw, *b*, Figs. 1 and 3, is inserted through the shell of the pedestal against the exterior of the cylindrical reservoir, and is provided with a lever, *c*, extending nearly to the floor, and within convenient reach of the foot of the operator. Upon turning the lever *c* the screw *b* is brought to bear upon the cylinder, and prevents its revolution. C is a cylinder formed within as a part of the reservoir B, and C′ represents a plunger adapted to slide therein. A leather cup and washer, (see Fig. 3,) secured to the lower end of the plunger, serves to fit it, water-tight, within the cylinder. A partition, *c′*, in the lower part of the reservoir, and situated a short distance from the lower head of the same, serves, in connection therewith, to form a chamber, *c″*, with which the lower end of the cylinder communicates. Two valves, *d d′*, Figs. 3 and 4, are located in the partition *c′*, and open into the chamber *c″*. These valves control the only means of access from the cylinder below the plunger to the reservoir B, and subserve an end hereinafter more particularly described.

The plunger C′ constitutes the support upon which the chair-body rests, and carries, at its upper extremity, a bar, *f*, upon which the chair-body is pivoted. The plunger is adapted to be elevated by means of a foot-lever, D, hinged to the upper part of the reservoir, and having upon its inner extremity a spring-pawl, *d″*, which engages with a series of recessed teeth upon the plunger. The lever is caused, after each stroke, to assume its normal position through the agency of a spring connecting the lower end of the pawl with the lower part of the reservoir. At the same time a projection, *x*, on the inner face of the lower part of the pawl strikes the upper edge or shoulder of the cylinder, and is thereby thrown out of engagement. Thus the lifting mechanism, when in the normal position to which it is returned by the action of the spring, is entirely disengaged and disconnected from the plunger.

The reservoir above described contains glycerine, oil, or other suitable liquid, which follows the plunger during its ascent, and prevents the descent of the same, owing to the closure of the valves *d d′*. The liquid that thus follows the plunger is supplied from the reservoir through the larger valve *d*, which automatically opens to permit passage of the liquid into the plunger-cylinder.

To lower the chair-body, it is obviously only necessary to open the valve *d′* and allow the

liquid to flow back to the reservoir, which, owing to the comparatively small size of the valve d', leaves the plunger-cylinder more slowly than it entered through the large valve d. This arrangement permits of the rapid elevation of the chair, and at the same time insures that it shall descend gradually and without shock. The pawl being out of gear, as above described, the plunger freely follows the liquid.

In order to open the valve, any convenient mechanism may be used. The means I have adopted consists of a wire connecting the valve with a lug, e, on the set-screw e'. (See Figs. 4 and 7.) This set-screw carries also a griping device, e'', and has attached to its outer end a foot-lever, e'''. (See Figs. 1, 2, 4.) By turning the lever in one direction the valve is opened by means of the wire and lug e. By turning it in the other the plunger is firmly clamped and held in position. A chain connects the lever e''' with the outer or swinging end of the foot-lever D, and is of such a length that the bringing of the foot-lever into position for elevating the plunger necessarily releases the griping device.

When not in use, the lever D is swung around out of the way of the operator. For this purpose the lever, as shown in Figs. 3 and 7, is made in sections (in this instance two sections) jointed together at D^1, so that the outer section can be turned on its hinge toward the chair, or rearwardly toward the chair and out of the way. A projection, D^2, on the outer section brings up against a stop on the inner section, when the lever is straightened out in position for use.

The chair-body is nearly balanced upon the bar f, and hence no especial mechanism is necessary in order to tilt the chair, but a slight exertion on the part of the operator sufficing to effect this end.

The mechanism for retaining the chair-body firmly in position at any angle is illustrated in Figs. 1, 2, and 19, and consists of a curved perforated bar, g, secured to some part of the chair-body, and a spring bell-crank, g', pivoted to the bar f. The short arm of the crank is hinged to a tapering bolt, g'', which slides through a part of the bar f, and is projected into the perforation in the bar g, which falls opposite.

The object in forming the bolt g'' tapering is to make a perfectly rigid fastening, and prevent motion or rattling.

The seat or cushion h, Figs. 1 and 17, is pivoted within the seat-frame, and tilts freely within certain limits, its angle thereby accommodating itself to the position of the patient. The seat is secured after adjustment by means of the set-screw h', Fig. 17, or by any other convenient means. The front plate h'' of the chair-frame is inclined inwardly in order to afford space for the dress of female patients while seated in the chair.

E E′, Figs. 12, 15, 16, represent, respectively, the upper and lower fixed foot-boards, the intervening space being occupied by the tilting foot-board F, hinged to the chair-frame. The mechanism for elevating this foot-board is illustrated in Figs. 15 and 16, and consists of the following elements: The inner sides of the chair-frame are furnished with slotted bars i, the upper sides of which are fitted with ratchet-teeth, with which pawls i', formed on or rigidly fixed to the ends of a crank-rod, i'', are adapted to engage. A foot-piece, i''', is attached to the crank-rod outside the chair-frame, the rod also carrying one or more arms, k, loosely attached to the under side of the tilting foot-board.

The pawls i' are normally in gear with the ratchet, but the motion of the foot-piece i''' in the direction indicated by the arrow releases them, and admits of the elevation of the foot-board. In this operation the foot-piece, in practice, is usually first slightly tilted so as to take the pawls out of engagement with the ratchets, and simultaneously with this movement the foot-piece, by a direct thrust of the foot, is pushed forward, traveling in the line of the slots, and, of course, carrying forward with it both the crank-pawl rod i'' and the connecting-rods k by which the foot-board is raised. Upon releasing the foot-piece the pawls engage with the teeth, and retain the foot-board at the point to which it has been raised. In order to lower the foot-board, the pawls are released, as above described, and the foot-board descends by its own weight, the pawls being held out of gear during the descent.

The extreme ends of the frame are connected by a foot-bar, F′, considerably shorter than the width of the chair-body, in order to enable the chair to be revolved in a limited space. The movable back G of the chair is attached to the frame by means of tongues and grooves, (see Figs. 1, 2, 13, 14, 18,) and is held at any desired elevation by means of bolts l, simultaneously projected outward by the revolution of a double cam, l', operated by means of a handle upon the movable back. This handle also serves as a means for elevating and lowering the movable back, and enables the operator to accomplish this by the use of one hand.

A supplemental or child's seat, G, (see Figs. 1, 2, 17, and 18,) is pivoted to the upper ends of the fixed chair-frame, and when extended for use is supported by bars pivoted to its sides. The said bars have pins l'' at their lower ends, which slide in grooves in the chair-frame, as shown, the grooves terminating in slots for sustaining the seat when extended. The supporting-bars are prolonged above the child's seat, and constitute its arms. When the child's seat is folded it forms a cushion for the back of the adult patient. The chair-frame being provided with a spring, l''', Fig. 17, into contact with which the child's seat comes when folded, the latter is made to bear with a yielding pressure against the back of the pa-

tient. The head-rest is secured to the upper end of the extensible back, and is illustrated in Figs. 1, 2, 20, 21, 22, 23, 24, 26, and 27.

A head-piece, H, formed of a curved plate, *m*, is provided with a shank extending from its lower edge, and is cushioned and upholstered as hereinafter described. The shank terminates in a ball, *m'*, which is confined in a socket of like shape in the first of a series of links. The latter consists of an elongated open block, *m''*, Figs. 20, 21, 22, in which slides a central block, *m'''*, and the socket in which the spherical knob rests is divided equally between the two. The other end of this link is provided with a tapering hole, situated similarly with reference to the two blocks, the hole being occupied by the upper cone of the pivot *n n'*. The lower cone *n'* fits in one end of a second link similar in construction to the one just described. The other end of this link receives the conical head of a bar, *n''*, and its under side is in contact with a collar on a second bar, *n'''*, through which collar the bar *n''* passes.

The bars are provided with teeth on their opposing faces, a slight longitudinal motion of the bars in opposite directions being required to bring the teeth fully in gear. (See Figs. 1 and 20.) The bars are inserted in the upper end of the extensible back of the chair, and between a cam, n^4, operated by a handle and a portion of the said back. The entire head-rest mechanism may be elevated and depressed as desired, and is secured in position by means of the cam, as shown in Fig. 20. It is obvious, from the conformation of the parts, that a single motion of the cam secures all the joints—a highly important feature, as it saves the time necessary to secure the various thumb-screws heretofore used with head-rests.

The several links that form the variable head-rest support are connected together and to the chair-frame by vertical pivots. The devices which connect them are cones, each of which fits in a tapering socket capable of expansion and contraction. The locking movement of the cam n^4 causes a downward movement of bar n^2; this pulls down the cone on the upper end of the bar into its socket, and so, by expanding the socket, pushes outwardly the movable block that forms one-half of the socket. But this block, at its opposite end, forms a part of the tapering socket of cone *n'*, and its movement, consequently, causes a contraction of said socket, and so forces downward the cone *n'*, which consequently draws down the upper cone *n* into its socket; and the expansion of the socket of cone *n* has the effect, through the medium of sliding block *m'''*, of contracting the spherical socket of the ball *m'*. Thus are all these joints stiffened and locked by a slight movement of a single cam. A reverse movement of the cam will unlock the joints and leave the several links free to move.

A swinging arm-rest, Figs. 26, 27, is pivoted to the back of the curved plate *m*, its pad or arm-rest proper swiveling freely at the end of the arm, in order to accommodate itself to the motions of the arm of the operator. The swinging arm is provided with a button, which may be inserted in one of a number of holes in the plate *m*, to secure the arm-rest at any angle and at either side of the head of the patient.

The cushion of the head-piece consists of two pads, *o o*, connected by means of a slack-strap, *o'*.

The water-reservoir, spittoon, instrument-trays, &c., are connected to the chair as follows: A rod, *p*, is secured to the bar *f* by means of a pin, *p'*, and swings freely, as shown in dotted lines in Fig. 2. A tubular rod, *p''*, is secured to the end of the rod *p*, in which tube the rod *p'''*, supporting the reservoir, is adapted to slide. The reservoir K is susceptible of a rotary or circumferential motion on the rod *p'''* as an axis, in common with its supporting-bar, and independent of the swinging bar *p* and its vertical tubular extension *p''*. The reservoir is made vertically adjustable by means of a collar, *r*, on the rod *p'''*, the collar being provided with a thumb-screw, *r'*. The part of the rod *p'''* between the reservoir and the pipe *r''* is tubular, and constitutes a duct for the passage of the water to the annular space *r'''* around the rim of the funnel *s*. A valve, *s'*, controls the exit from the reservoir, being opened by means of a wire leading to the top of the latter.

A pipe, *s''*, leading from the reservoir, is used in drawing drinking-water, and a tray, *s'''*, for a tumbler is attached to the pipe *r'''*. The pipe *s''* is provided with a valve operated by means of a sleeve, *t*, on the lower end of the pipe, connected to the valve through the medium of a wire.

To a revolving sleeve on the rod *p'''* is secured an arm, *t'*, supporting the standard *t''* for the instrument-trays. A vertically-adjustable arm, *t'''*, extending from the polygonal notched standard *t''*, carries a differentially-collared stud, *u*, upon which the trays *u'* rest, and are fitted to turn in any direction. Any suitable device may be employed to secure the arm *t'''* to the standard. A convenient means is shown in Fig. 11.

The spittoon-bowl *v* is detachable from the funnel *s*, and to this end is provided with pins *v'* projecting from its outer edge, the same being inserted in slots on the upper part of the bowl, the entrance being by means of notches *v''*. (See Fig. 10.) A gold-trap, L, is suspended within the bowl of the spittoon, and directly below the neck of the funnel, by means of wires extending from a ring, *v'''*. By raising the ring the trap may be readily removed.

Handles M, on either side of the chair, are designed for use by the patient during painful or violent operations. A foot-stool, N, is pivoted to one of the legs A', and a seat, O, is secured to the chair-frame, for the use of the operator.

My design has been to furnish a dental chair

susceptible of every adjustment which can possibly be needed, and adjustable also without the necessity of the chair being vacated by the patient.

Furthermore, the means I have devised admit of the elevation and lowering of the chair and foot-board, and the securing of the chair-body by means of the foot of the operator. Heretofore these operations could only be performed by hand, involving delay and the exercise of considerable muscular effort on the part of the arm of the operator, causing fatigue and its natural consequences, nervousness and unsteadiness of hand. It will have been observed that the portions of my chair, such as the head-rest, spittoon, instrument-trays, &c., are susceptible of adjustments impossible with the various forms of dental chairs heretofore used, and that these adjustments, while more varied and complete in my chair, are at the same time accomplished, by the means I have described, with greatly increased facility and dispatch.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. In a dental chair, the combination of these elements—a vertically-movable seat-support, a lifting mechanism therefor, which normally is out of engagement with the support, and mechanism distinct from the lifting mechanism to hold the said support at any point to which it is raised by the lifting mechanism, and to permit it, when desired, to pass gradually and without shock from that elevated point to a lower one, the combination being and acting substantially as set forth.

2. The combination, substantially as set forth, of a vertically-movable seat-support, mechanism for elevating said support, and a fluid column for upholding said support at any elevation to which it may be raised.

3. A dental chair supported upon a plunger adapted to be elevated within a sheath by suitable means, the said sheath communicating with a fluid supply by means of a duct or opening provided with an inlet-valve, whereby the fluid is allowed to follow the plunger as the latter is elevated, and to sustain it at any point, substantially as described.

4. A dental chair mounted upon a plunger adapted to be elevated within a sheath by means of a ratchet and pawl, the said sheath communicating with a fluid-reservoir by means of a suitable valve, whereby the fluid is allowed to rise beneath the plunger as the latter is elevated, and to sustain it at any point, substantially as described.

5. A plunger placed within a sheath and supporting a dental chair, said plunger being adapted to be elevated by means of a ratchet and pawl, and sustained at any point by means of a fluid medium entering said sheath as the plunger rises, as set forth.

6. The combination, in a dental chair, of a seat-supporting plunger, mechanism for lifting the same, a fluid column for upholding said plunger at any point, and locking devices for griping said plunger when so upheld, substantially as herein shown and set forth.

7. A foot-lever for operating the elevating devices proper, constructed in sections hinged or pivoted together, substantially as set forth.

8. In a dental chair, elevating mechanism and a locking device connected together, whereby the latter is released in the act of bringing the elevating mechanism into position for use, substantially as described.

9. In combination with the swinging end of the jointed foot-lever, a flexible or jointed connection between the same, and the mechanism for clamping the plunger, whereby the latter is released in the act of straightening out the lever, substantially as described.

10. In combination, with a non-rotating pedestal and a vertically-movable seat-support, an intermediate rotary cylinder which receives and carries the seat-support, and has its bearing in said pedestal, and elevating mechanism which is carried by said cylinder, and is adapted to raise the seat-support independently of both the rotary cylinder and non-rotating pedestal, substantially as herein set forth.

11. A chair-body mounted upon a plunger sustained at any desired height by means of a fluid medium, the said chair-body being adapted to tilt, and being provided with means for securing it at any desired angle, substantially as described.

12. A seat pivoted centrally, or nearly so, and capable of slight oscillations upon said pivot, in order that the seat may adapt itself to the position assumed by the occupant of the chair, substantially as described.

13. In a dental chair, a seat pivoted centrally, or nearly so, so as to be capable of slight oscillations for the purpose described, in combination with a locking device for securing the seat at varying angles, as required, substantially as set forth.

14. The front plate of the chair, below the seat-frame, inclined inwardly, in combination with the upper fixed foot-board and the lower foot-board, substantially as shown and described, whereby the upper board is carried so far to the rear as not to interfere with the free use of the lower foot-board.

15. In combination with a dental chair, and forming a part thereof, a movable foot-board, adapted to be elevated, lowered, and secured by the foot of the operator, substantially as described.

16. In combination with the fixed foot-boards of a dental chair placed in different planes, an intermediate adjustable foot-board, adapted to be operated by the foot of the operator, substantially as set forth.

17. In a dental chair, a movable back sliding in a right line, and provided with a clamping device which is attached to the said back, and constitutes a handle for elevating the same, substantially as described.

18. In a dental chair, a movable back con-

nected to the fixed frame by tongues and grooves, and provided with a locking device which constitutes a handle for elevating it, substantially as described.

19. In a dental chair, a supplemental or child's seat, forming an integral part of the chair, arranged to occupy, when in use, a position above the main seat, and adapted, when not in use, to be folded or turned out of the way of the main seat, substantially as set forth.

20. In combination with a dental chair, a child's seat adapted to form an elastic back for the chair when the latter is occupied by an adult patient, substantially as described.

21. In combination with a dental chair, a supplemental or child's seat, pivoted to the back or body of the chair, and adapted, when folded down, to form a supporting device for the back of the adult patient, substantially as set forth.

22. The supplemental or child's seat having its supports extended above the seat when opened in order to form arms therefor, substantially as set forth.

23. In a dental chair, a head-rest pivoted twice about parallel axes and once about a ball-and-socket joint, as set forth.

24. A head-rest support formed of links or sections united by conical or tapering pivots seated in correspondingly-shaped sockets capable of expanding and contracting, and bounded, in part, by movable blocks which transmit the movement from one cone and socket to the next throughout the series, whereby the several joints will be tightened by the operation of a single device, substantially as set forth.

25. In combination with the head-rest of a dental chair, an arm-support for the operator, substantially as described.

26. In a dental chair, an arm-rest adapted to be secured at either side of the head-rest, substantially as described.

27. In combination with the head-rest of a dental chair, a swiveling arm-rest, substantially as described.

28. A head-rest for a dental chair consisting of a pair of pads connected by means of a slack strap, as set forth.

29. In combination with a dental chair, a spittoon pivoted twice about vertical axes, whereby it may be made to occupy any position within the circle described by the extreme radius of the supporting-arms, substantially as described.

30. The combination, with the spittoon of a dental chair, of a water-reservoir connected with and carried by the chair, and adapted to deliver a supply of water to the spittoon, for the purpose of rinsing the same, substantially as set forth.

31. In combination with the spittoon of a dental chair, a water-reservoir adapted to deliver a supply of water through an annular opening near the rim of the spittoon, substantially as described.

32. A trap suspended within a spittoon by means of wires attached to a removable ring of greater diameter than the neck of the spittoon, substantially as described.

33. In combination with a dental chair, a foot-stool for the operator, attached thereto, substantially as described.

34. A support for a dental chair consisting of three legs radiating from a common center, at equal distances apart, the back leg extending rearward centrally of the chair, in combination with a fourth radial leg extending directly to the front, and bisecting the angle formed by the two side legs, as set forth.

35. In combination with the water-reservoir K, a cock consisting of the tube *s''*, having at its inner end a valve operated by a sleeve resting over the outer end of said pipe, and a wire passing within the same and attached to the valve, as described.

36. The combination of the water-reservoir K, having a pipe the opening of which is controlled by a valve combined with the funnel *s*, having the annular opening *r'''*, communicating with the supply-pipe leading from the reservoir, all substantially as described, and for the purpose set forth.

37. The combination, substantially as set forth, with the seat-supporting plunger, its cylinder or sheath, and the elevating mechanism, of the fluid-reservoir provided with a large inlet-valve, which permits the fluid to follow a rapid ascent of the plunger, and a smaller outlet-valve, which permits the fluid to be displaced by the descending plunger slowly, so as to insure the gradual and easy descent of the chair-seat.

38. The plunger-cylinder arranged within the fluid-reservoir, and terminating at its upper end, below the top of said reservoir, so that any fluid that may happen to be drawn up through the cylinder can pass back therefrom into the reservoir, as shown and set forth.

In testimony whereof I have hereunto subscribed my name this 16th day of April, A. D. 1877.

BASIL M. WILKERSON.

Witnesses:
WM. S. HOWARD,
G. E. SANGSTER.

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