H. WOODBURY.
Dental-Chair.

No. 213,021 Patented Mar. 4, 1879.

Fig: 1.

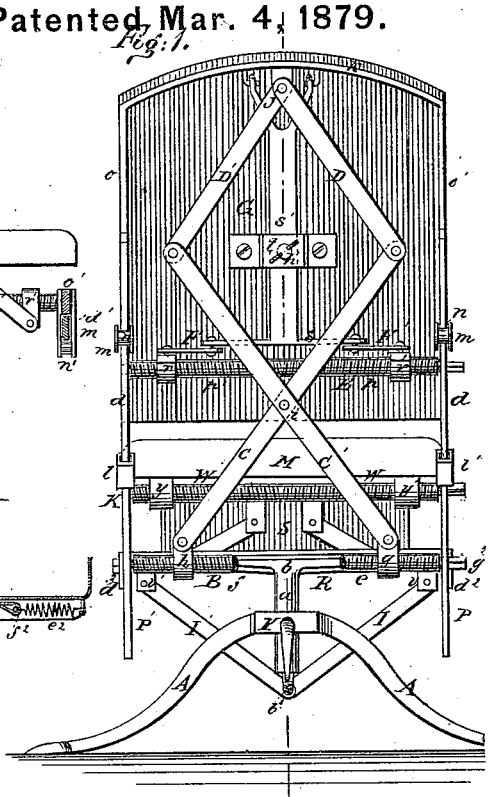


Fig: 2.

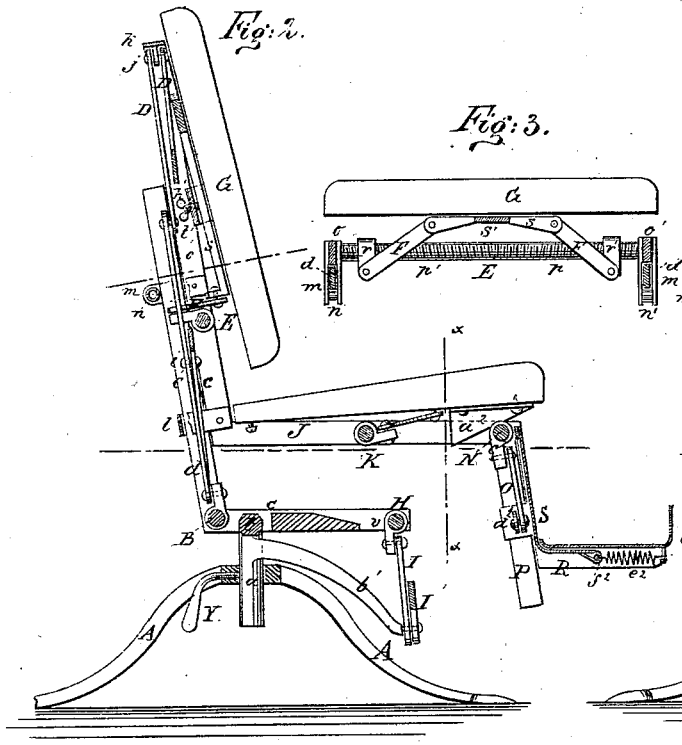


Fig: 3.

Fig: 4.

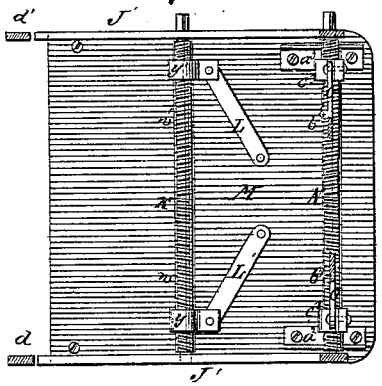


Fig: 5.

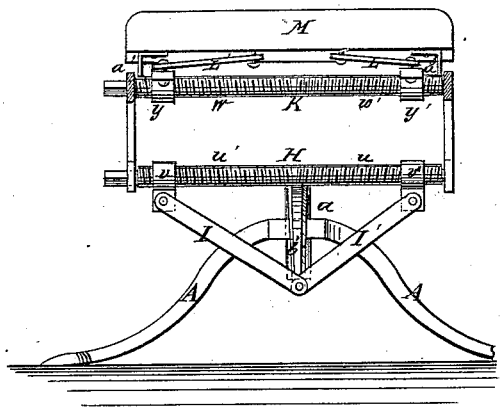


Fig: 7.

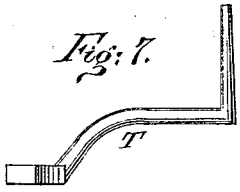
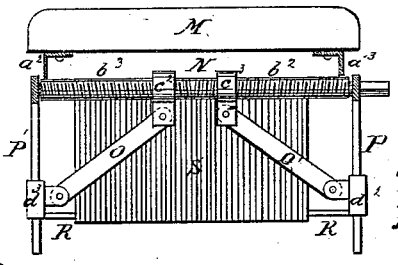


Fig: 6.



Witnesses:

Chas. Nida.

H. C. Mattenberg.

Inventor:

Hibbert Woodbury

per Munn & Co

Atty

UNITED STATES PATENT OFFICE.

HIBBERT WOODBURY, OF BABYLON, NEW YORK.

IMPROVEMENT IN DENTAL CHAIRS.

Specification forming part of Letters Patent No. **213,021**, dated March 4, 1879; application filed August 13, 1877.

To all whom it may concern:

Be it known that I, HIBBERT WOODBURY, of Babylon, in the county of Suffolk and State of New York, have invented a new and Improved Dental Chair; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification.

This invention is in the nature of an improvement in dental chairs; and the invention consists in a dentist's chair with its back-posts, supporting-axis, seat, back, and foot-rest provided with right-and-left-hand screws and toggle-joints, whereby the chair is elevated from its support and inclined on its supporting-axis, and whereby the seat, back, and foot-rest may be severally adjusted, the back of said chair having also vertical adjusting devices, the seat thereof having inclined elevating-cleats, and the foot-rest thereof being provided with a flexible adjustable apron.

In the accompanying sheet of drawings, Figure 1 is an elevation of back of chair; Fig. 2, a side elevation of same; Fig. 3, end view of back panel, partly in section; Fig. 4, a view of under side of seat; Fig. 5, a section through line *x x*, Fig. 2, of seat and lower part of chair; Fig. 6, a rear view of screw and connections for operating foot-rest, and Fig. 7 a view of operating-crank.

Similar letters of reference indicate like parts in the several figures.

A represents the support of the chair, which may be of any suitable size and material, into a bearing through the center of which is fitted a pivotal support, *a*, to the upper end of which is secured a transverse pivot-bar, *b*. This pivot-bar has its ends received into horizontal arms *c*, which arms form a support for the seat of the chair, and they also support back-bars *d*. Into the lower ends of these back-bars is journaled a screw, B, so that it may freely revolve. This screw has formed on it right and left hand screw-threads *e* and *f*, onto which, with corresponding screw-threads, are fitted nuts *g* and *h*. To these nuts are affixed levers C and C′, which cross each other, as is shown in Fig. 1, and at the point of their intersection are confined by a rivet, *i*. From the upper ends of the levers C and C′ extend two other levers or arms, D D′, their upper ends being united by a rivet, *j*, and also to the upper part of the frame-work *k* of the back. This frame-work of the back is secured to the back-bars *d* by sleeves *l l′*, and also by plates *m*, which plates have friction-rollers *n n′* fitted to them. To the side posts, *o o′*, of the frame-work of the back *k*, and a short distance from their lower ends, is journaled a second screw, E, which has right and left hand screw-threads *p p′* cut thereon, and onto these screw-threads are fitted nuts *r r′*, with like screw-threads. To these nuts are attached the ends of levers F F′. To the other ends of these levers is fixed a bar, *s*, which unites them. These levers are also attached to the rear of the back-panel G of the back. To the bar *s* is fixed a guide-bar, *s′*. This guide-bar extends upward, and its upper end is fixed to the upper part of the back-frame *k*. Spanning this guide-bar *s′* is a cleat, *t*, which is secured to the back of the panel G.

Journaled to the front ends of the horizontal arms *c* is a screw, H, which has formed upon it right and left hand screw-threads *u u′*. Onto these screw-threads are fitted nuts *v v′*, with corresponding screw-threads, and to these nuts are attached the ends of levers I I′, the other ends of said levers being united to a supporting-arm, b^1, which springs from and is secured to the pivot *a*.

Affixed to the lower part of the back-posts *o o′*, and forming part of the same, are the seat-rails J J′, and centrally between the extremes of these seat-rails is journaled a screw, K, which has right and left hand screw-threads *w w′*. Onto these screw-threads are fitted nuts *y y′*, with corresponding screw-threads formed in them, and to these nuts are fixed ends of levers L L′, the other ends of these levers being secured to the under side of the seat M.

At or near the front of the under side of the seat are secured two inclined cleats, a^2 a^3, and at or near the front ends of the seat-rails J J′ is a screw, N, upon which are formed right and left hand screw-threads b^2 b^3, and on these

screw-threads are fitted nuts c^2 c^3, having corresponding screw-threads formed therein, and to these nuts are secured levers O O′, the outer ends of these levers being secured to the foot-rest near the sleeves d^2 d^3, which are fitted onto supports P P′ for the foot-rest, which supports are fixed to the front ends of the seat-rails J J′, depending from and forming part of the same.

To the sleeves d^2 d^3 is attached the foot-rest R, and to the under side of this foot-rest are affixed two spiral springs, e^2 e^3, which spiral springs are united by a bar, f^2, and to this bar is fastened one end of a flexible apron, S.

Now, my chair being constructed substantially as I have described it, its operation is as follows: When the dental operator desires to elevate his patient, so as to bring the mouth to a convenient height for operating therein, a crank, T, is fitted to the square end g^2, that projects beyond one of the back-bars d, and by turning the crank to the right the screw B is revolved, causing the nuts g h to approach toward each other and toward the center of the screw-shaft B, carrying with them the levers C C′, by which operation they are caused to assume positions less and less at right angles to one another, or, in other words, to approach positions nearer and nearer the perpendicular until the nuts g h are brought to the center of the screw-shaft, when these levers C C′ D D′ are very nearly vertical and at right angles to the screw-shaft B. Now, it is obvious that the nearer the levers C C′ D D′ approach the vertical from a position at right angles to each other, they increase their vertical height above the screw-shaft B, so that the back-frame k of the chair, which is attached to the levers C C′, (through the intervention of the levers D D′,) is forced to slide upward on the back-bars d, as the nuts g and h are forced toward each other by the action of the screw-shaft B; and since the frame of the back, seat, and foot-rest are united, the entire chair, consisting of the back, seat, and foot-rest, is elevated from its support A by the simple turning of the screw-shaft B.

The height to which the chair may in this way be raised is only limited by the number of additional levers that may be joined one to the other, as shown in Fig. 1, in which figure four levers are represented. As the chair is elevated in the manner just described, the back-bars d act as guides, the sleeves l and l' sliding on the same, the friction-rollers n n' on the plates m facilitating the operation.

When the chair is to be lowered, it is done by a reverse operation—that is, the screw-shaft B, by means of the crank T, is revolved to the left, when the nuts g and h travel from each other toward the extremities of the screw-shaft, causing the levers C C′ D D′ to assume positions less and less from the perpendicular until they are substantially at right angles to one another, in which last position the seat-rails J J′ come in contact with and rest upon the horizontal arms c, which support the chair.

In this way the entire chair, as before stated, is elevated, and to any height desired, by the operator, and it remains fixed and positive at any height required, without danger or even possibility of moving from the height at which it is fixed, unless by the operation of the crank and screw, as before mentioned.

To incline the patient so that the mouth may be brought to the proper angle for operating, and at the same time make the patient as comfortable as possible, the crank T is fitted onto the screw-shaft H; and as this screw-shaft is turned to the right the nuts v v' thereon are forced toward each other, (in manner precisely as described when referring to the nuts g and h,) causing the levers I I′ to form an angle less than a right angle, and, by such movement acting on the end of the brace b^1 as a fulcrum, causing the horizontal arms c to turn on the pivotal bar b, so that the back-bars d, attached to said horizontal arms, and the entire chair supported thereon, are tilted backward from their normal horizontal position. This tilting may be fixed at any angle desired by simply ceasing to turn the screw H, and the position at which it is inclined will remain fixed and positive, and cannot be disturbed except by again turning the screw-shaft H. To restore the chair to its normal position the screw-shaft H is turned to the left, when the nuts v v' and levers I I′ will act reversely to the manner just described.

To incline the front end of the seat M without disturbing the other parts of the chair, the screw-shaft K is turned by the crank T to the right. This operation forces the nuts y y' to operate in the same manner as heretofore described in describing the operation of the nuts v v', and as the levers L L′ approach a right-angular position the front end of the seat M is raised above the seat-rails J J′, the inclined cleats a^2 a^3 elevating the front of the seat, and also acting as guides to steady the seat as it is raised. To lower the front end of this seat an operation the reverse of that just described is performed.

By turning the screw-shaft N to the right by means of the crank T, the nuts c^2 c^3 approach each other and draw levers O O′ to positions approaching the horizontal, and by so doing cause the foot-rest R, to which said levers O O′ are attached, to be drawn upward, the supports P P′ acting as guides for the sleeves d^2 d^3, to which the foot-rest R is secured. A reverse motion of the screw-shaft N causes the foot-rest to descend, and by raising and lowering it in this way it can be adjusted to the comfort of the occupant.

By revolving the screw-shaft E (which is fitted to the back-posts o o') to the right, the nuts r r' thereon are forced toward each other, the levers F F′ being advanced from an angular to a position more at right angles to each other; and as they assume this last-named po-

sition the back-panel G is forced outward at or near its lower part, so as to afford support to the small of the patient's back. To withdraw this panel to its normal position the screw-shaft E is turned to the left, when the nuts and levers operate in a reverse manner to that just described.

From the foregoing description of the adjustment of my chair and its several parts—such as the chair proper, its inclination, the back-panel, the seat, and the foot-rest—it will be seen that each and every one of these adjustments is accomplished independently of the others, and that each adjustment, whether the same be to a large or small degree, is positive and fixed in the position the operator desires to leave it, from which position it cannot be disturbed, except by operating the screw which pertains to the particular adjustment attained. Therefore, all danger from accidental displacement or unsteady motion, which would be likely to interfere with the delicate operations of a dentist, is avoided.

Another important feature of this construction is, that the different adjustments are all had without requiring the patient to unseat himself from the chair; and still another advantage is, that the adjustments are the most rapid at the first turning of the screws, so that the ordinary and moderate adjustments, or those most used, are the most readily and speedily obtained.

In addition to the various adjustments above named, by means of right-and-left-hand screws and levers, the back-panel G also has a vertical sliding movement, so that it may be raised above the frame *k* of the back, for the purpose of supporting the patient's back, by simply sliding it upward, the guide-bar *s'* acting as a guide within the cleat *t* to steady such movement, and the panel is retained in its vertical sliding position by a set-screw, *h'*, which passes through the cleat *t*, and clamps the cleat to the guide-bar *s'* wherever required.

To protect patients from exposure, the space between the under side of the seat and the foot-rest is filled by an apron, S, and as the foot-rest is raised the "slack" of this apron is taken up by the spiral springs e^2 e^3, and as the foot-rest is lowered this slack is given out by the expansion of the springs, so that the apron at all times is stretched and presents a smooth and finished appearance, as well as accurately filling the space it is designed to cover.

The entire chair may swivel or turn on its support by the pivot *a*, which is secured to the pivotal bar *b*, and it is held in any desired position to which it is turned by the clamping-screw V.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A dentist's chair the back, seat, and foot-rest of which are adapted to be separately adjusted by screws and toggles, and these several parts secured within a continuous rigid frame, *o o'* J J' P P', and the latter adapted to be adjusted and carry with it the said back, seat, and foot-rest, substantially as described.

2. In a dentist's chair, the seat, back, and foot-rest provided with right-and-left-hand screws and toggles, substantially as shown, whereby the said seat, back, and foot-rest may be severally adjusted, the back of said chair having also vertical adjusting devices, the seat having inclined cleats, and the chair, as a whole, having a separate adjustment through its frame *o o'*, J J', P P', and *c*, screw H, toggles, and pivot-bar, substantially as described.

3. In a dental chair, the foot-rest thereof, provided with springs, in combination with an apron, whereby the slack of the apron may be taken up and given off as the foot-rest is raised or lowered, substantially as described.

HIBBERT WOODBURY.

Witnesses:

A. A. ASHMUN,

FRANK WOODBURY.