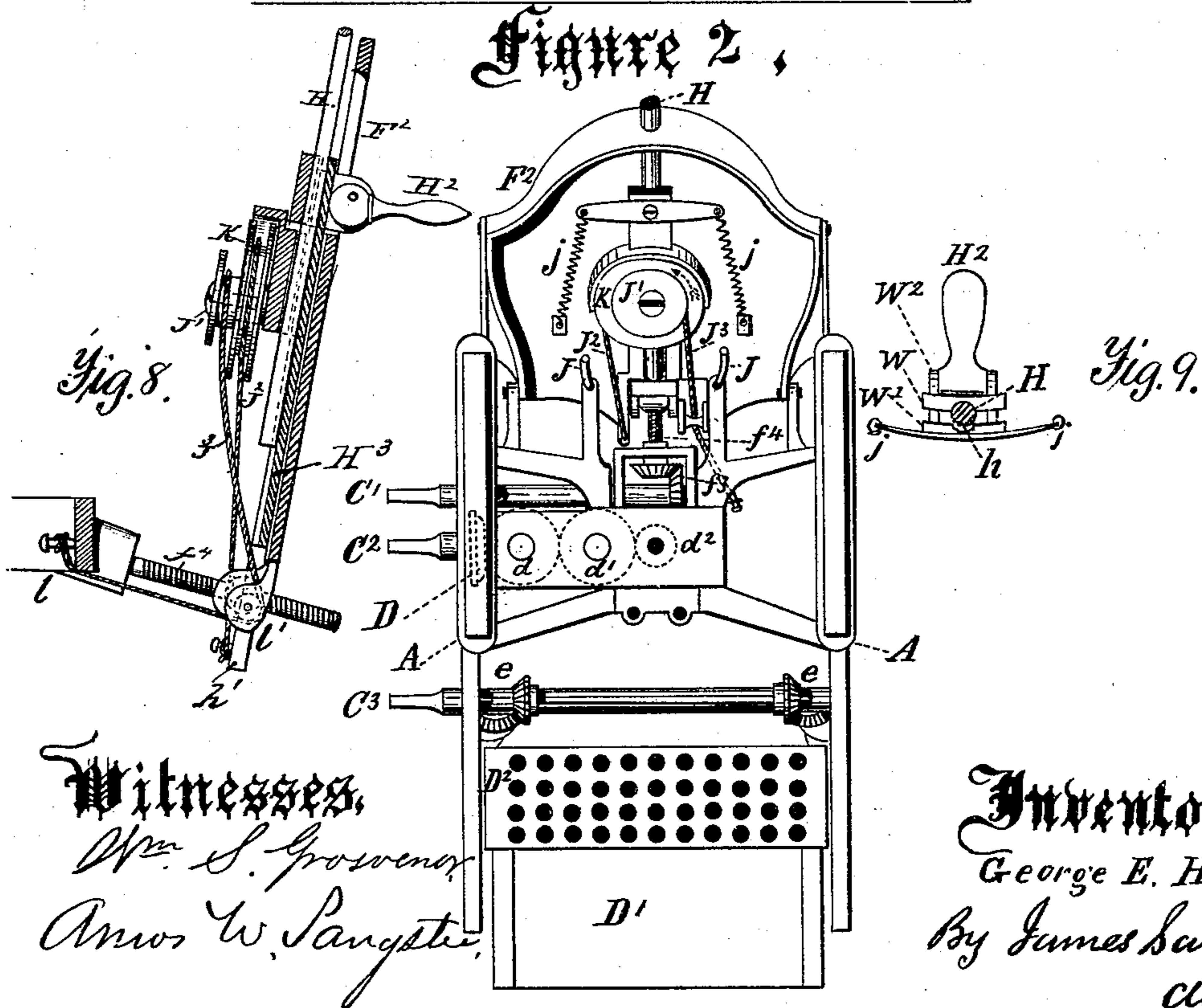
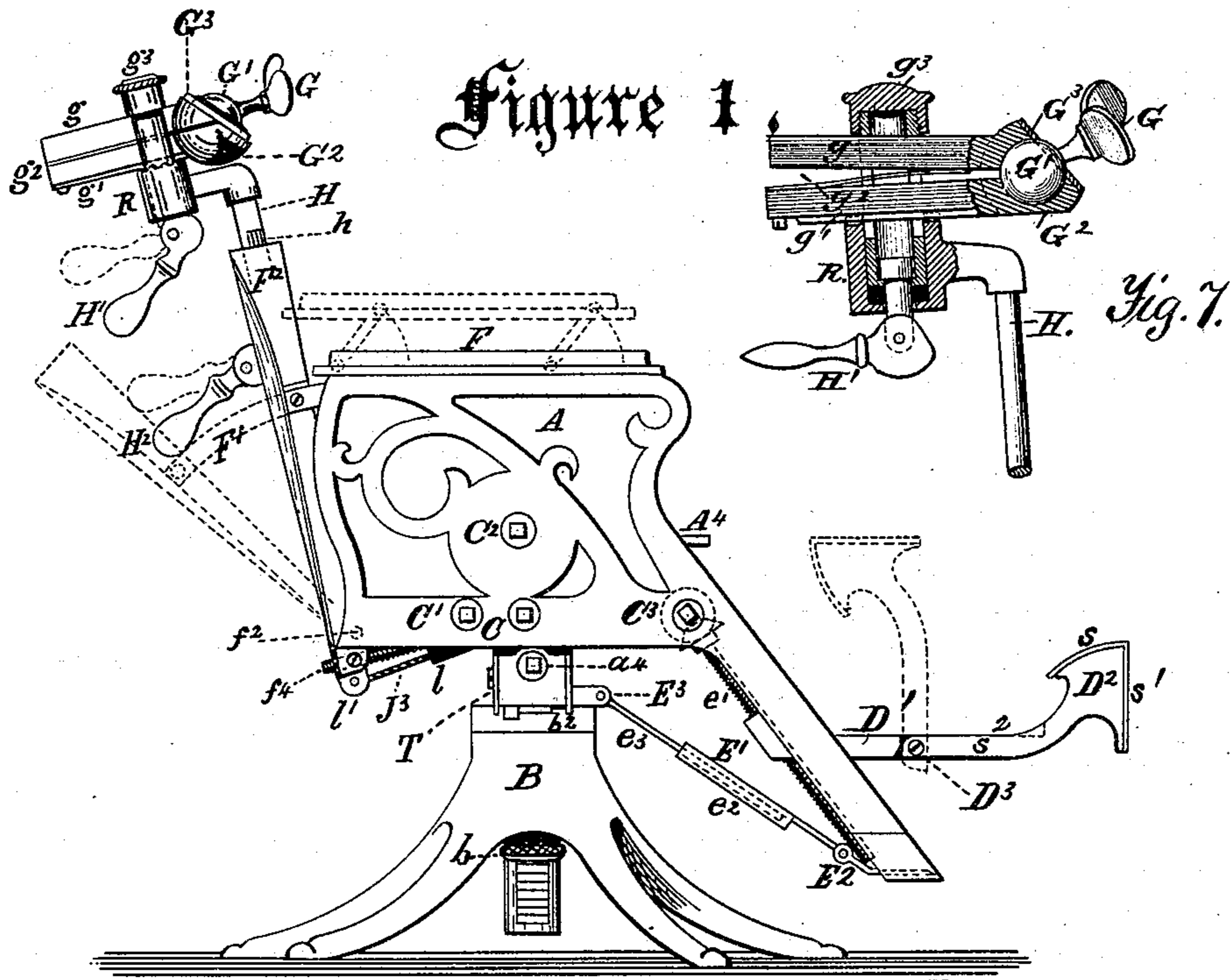


G. E. HAYES.
DENTAL CHAIR.

No. 181,575.

Patented Aug. 29, 1876.



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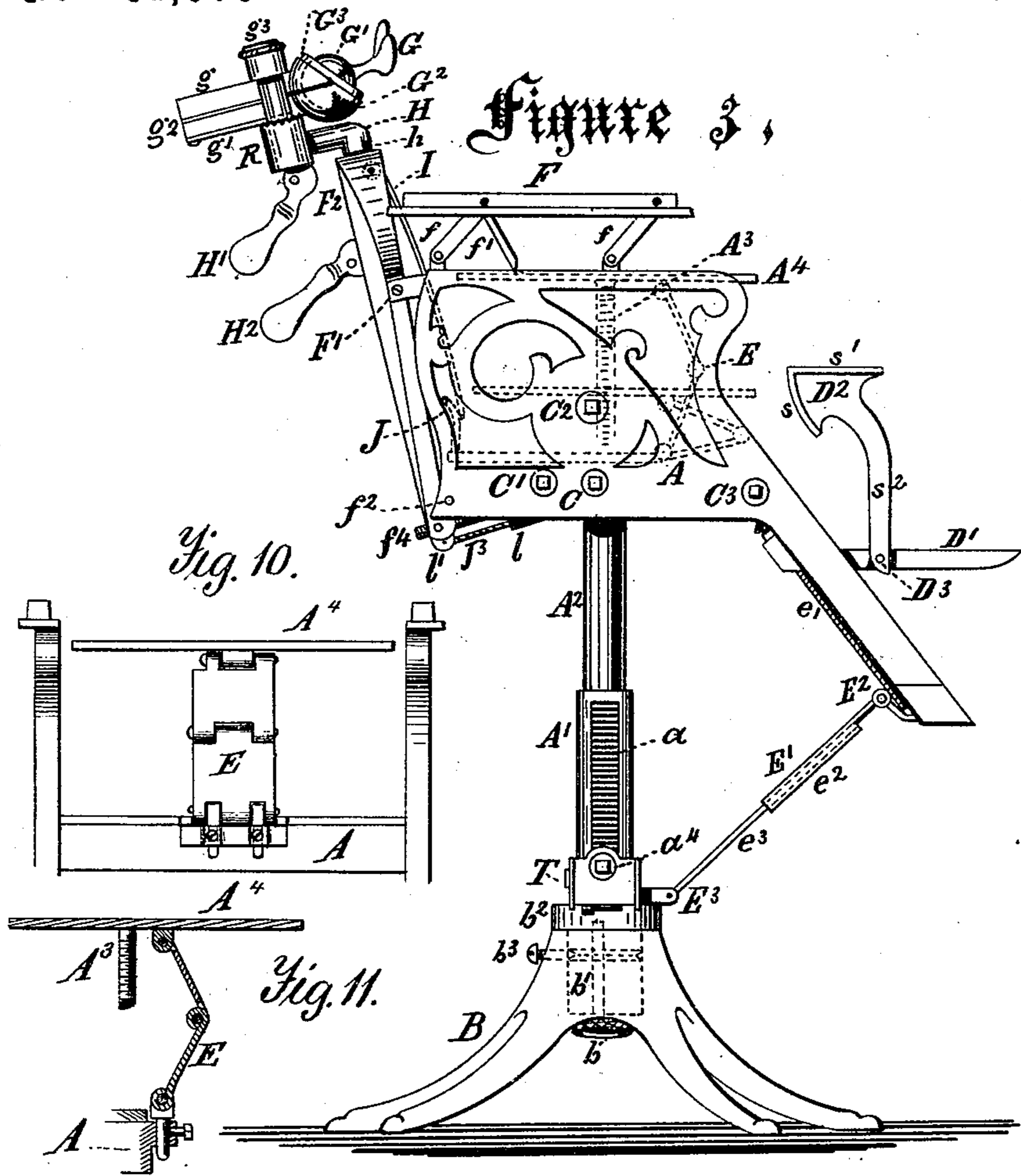
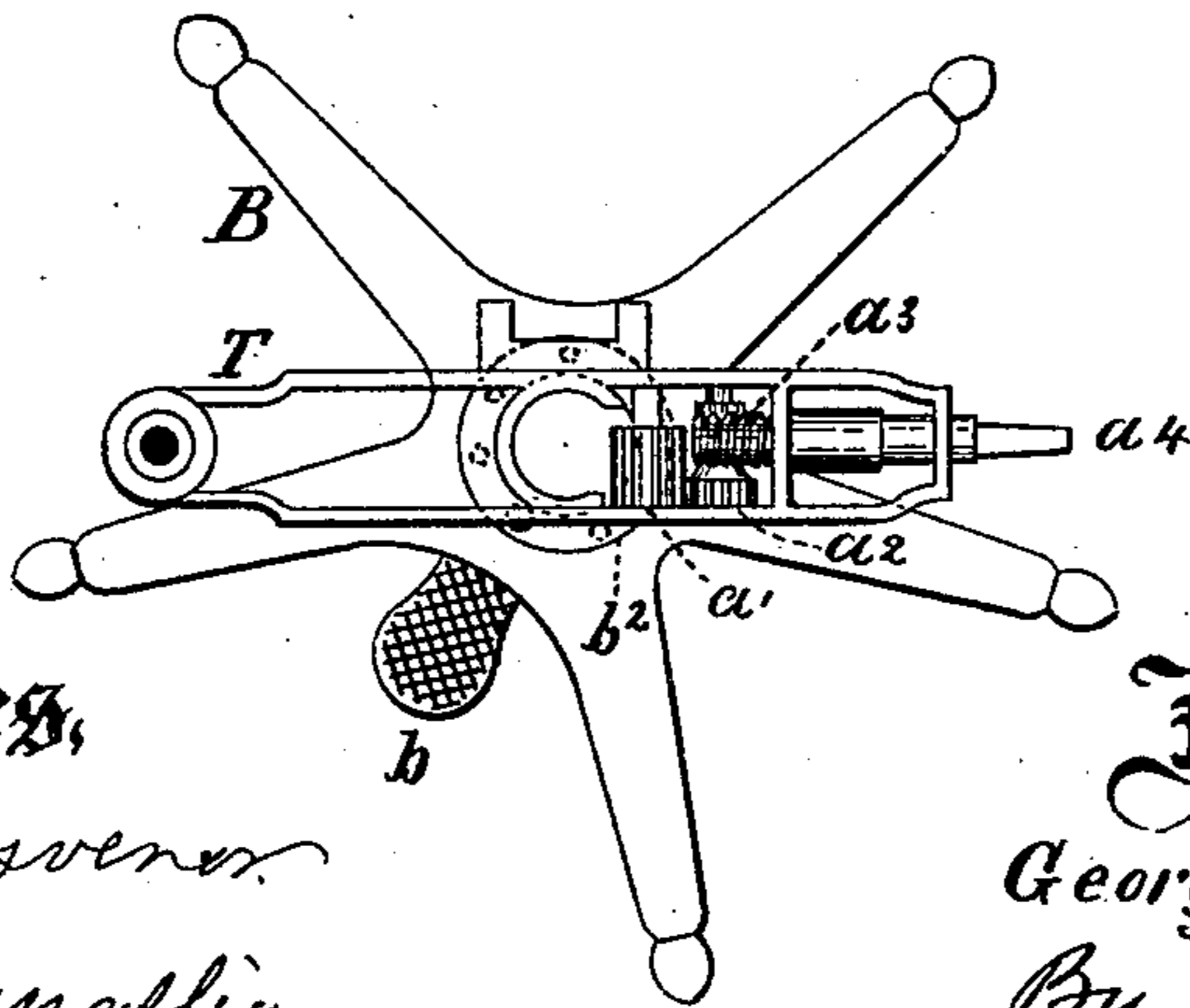


Figure 4 ,



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Figure 5.

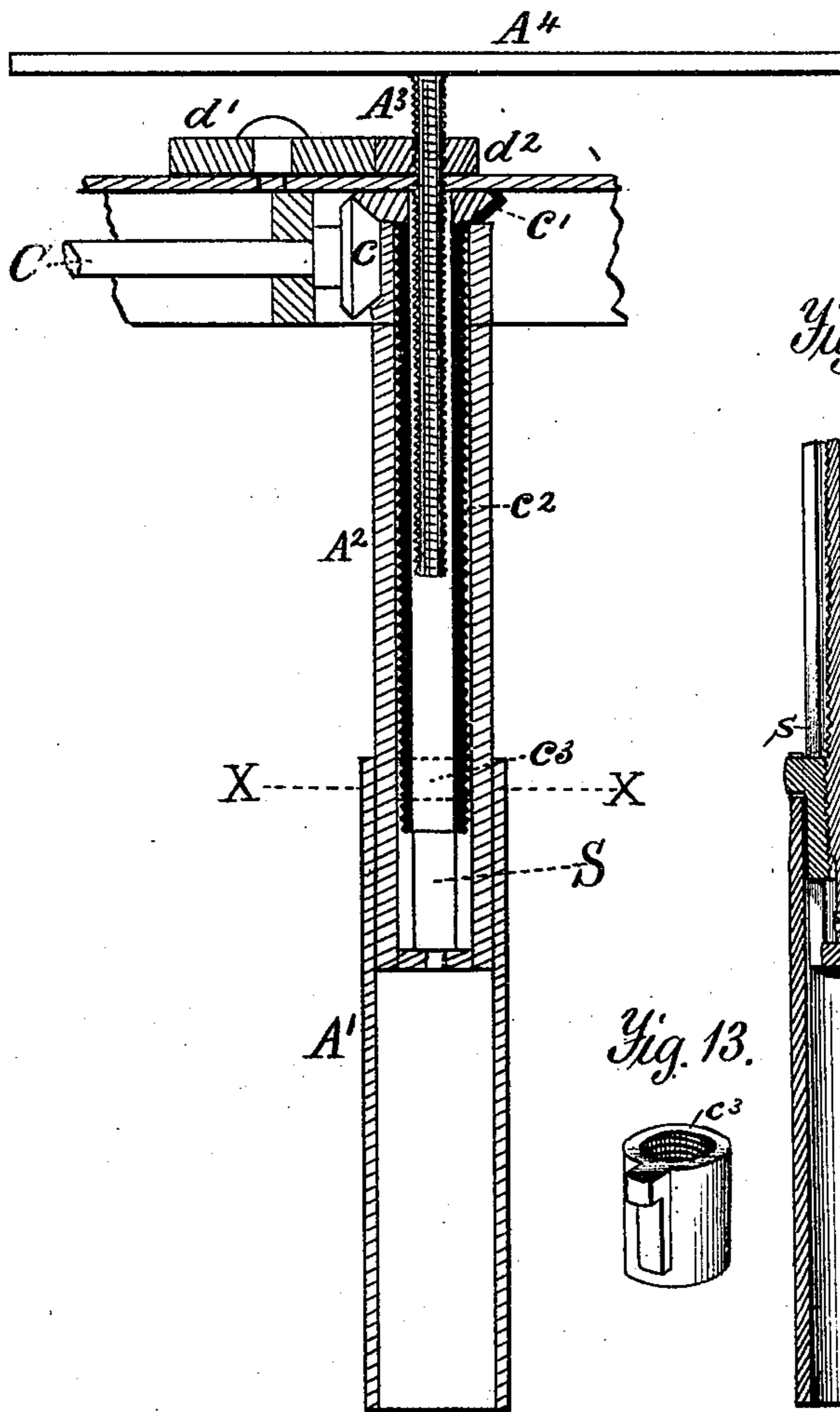


Fig. 12.

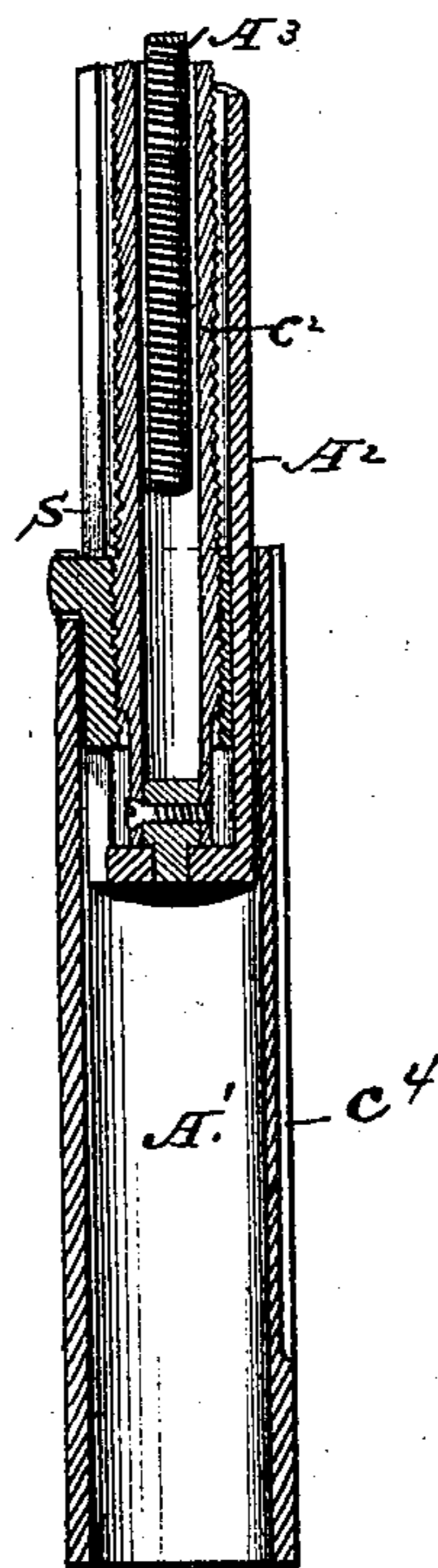


Fig. 13.

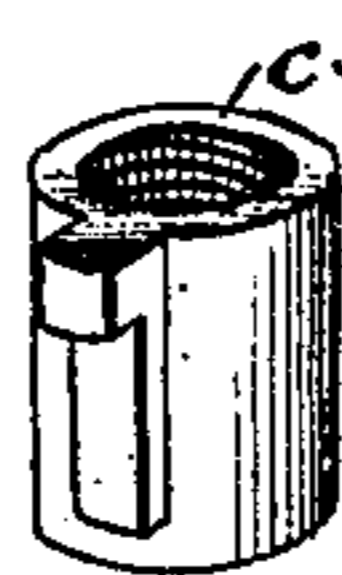


Figure 6.



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UNITED STATES PATENT OFFICE.

GEORGE E. HAYES, OF BUFFALO, NEW YORK.

IMPROVEMENT IN DENTAL CHAIRS.

Specification forming part of Letters Patent No. **181,575**, dated August 29, 1876; application filed August 17, 1875.

To all whom it may concern:

Be it known that I, GEORGE E. HAYES, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Dental Chairs, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of this invention is to provide the means for an easy and ready adjustment of the chair from its normal or half-elevated adjustment to its lowest position, in which the patient's head may be brought directly into the operator's lap while he occupies an easy-chair, or so that it may be elevated sufficiently high, together with the foot-step, arms, and head-rest, to form a baby-chair, in which its face may be brought nearly on a level with the eyes of the operator; and it consists, first, in the combination, with the base and chair-frame, of a movable telescopic column and the necessary gearing for operating it, so arranged that several adjustments in the height of the chair may be made, thereby affording the means within a small compass for reaching the highest as well as the lowest position required, and so that, in whatever position the chair may be adjusted, the several parts will be held rigid or immovable in that position, until changed by the crank or other proper means for moving it, no pins, catches, or other fastenings being required, every part being secure wherever the crank or moving device leaves it.

Second, my invention further consists in an adjustable head-rest, combined with an automatic adjusting device for keeping it at the same height and in the proper position, corresponding to the movement of the head of the patient while the back of the chair is being moved in either direction.

The third part of my invention consists in the employment of a foot-rest, composed of an angle-plate, so hinged to the movable frame or platform which supports it that it may extend therefrom either in a horizontal or in a vertical direction, one face or the other of its angle-plate forming a support for the feet in either position. The adjustment of the movable frame or platform, to which the foot-rest is connected, is ample to accommodate all

adults, but is insufficient to raise the foot-rest high enough for small children; and to provide for their comfort I construct and connect the foot-rest in the manner stated.

The fourth part of my invention consists in the combination of a head-rest, a bar for sustaining it, a ball-and-socket or universal joint, a clamping device, and a cam-lever, so that the head-rest may be adjusted in any desired position, and firmly held in place.

The fifth part of my invention consists in the combination of movable arms with the side frame of the chair, which may be elevated or lowered, so as to correspond with the seat when in position to form a baby-chair.

The sixth part of my invention consists in the combination of a sliding or extension brace with the frame of the chair, for preventing the rotation of the same, and thereby holding it more securely at any point of its vertical adjustment.

The seventh part of my invention consists in the combination of a jointed brace with the seat of the chair, for preventing any rotary or side motion thereof.

In the said drawings, Figure 1 is a side elevation of the chair complete, as adjusted when the seat is in its lowest position. Fig. 2 represents a plan view of the machinery below the seat, and also the arrangement of the mechanism in the back of the chair for operating the head-rest automatically. Fig. 3 is a side elevation, showing the chair-seat, arms, and foot-step when adjusted to their highest position. Fig. 4 represents a plan of the base, the foot-step for controlling the rotary adjustment of the chair, and part of the mechanism for elevating the lower section of the telescopic column. Fig. 5 is a vertical section through the elevating-column, and a part of the elevating machinery; and Fig. 6 represents a section through line X X, Fig. 5. Figs. 7 to 13 are detail views.

In said drawings, A represents the sides of the chair. $A^1 A^2 A^3$ are the sections of the telescopic column, by which the three adjustments in the height of the chair are made. B is the base for supporting them. The first column, A^1 , is operated by means of the rack a , Fig. 3, pinions $a^1 a^2$, screw-gearing a^3 , and square-headed crank-shaft a^4 , Fig. 4. The op-

eration of the second column, A^2 , is controlled by the crank-shaft C , a portion of which is shown in Fig. 5, bevel-gearing $c\ c^1$, screw-tube c^2 , which is rigidly fastened to c^1 , and works in a fixed nut, c^3 , on column A^1 , Fig. 6. Column A^3 , to which the seat A^4 is fastened, is made in the form of a screw, and is operated by means of the crank-shaft C^2 , gearing $D\ d\ d^1\ d^2$, (shown by dotted lines, Fig. 2, and $d^1\ d^2$ in section, Fig. 5,) d^2 acting as a nut for the screw A^3 . A^1 has a groove, c^4 , arranged lengthwise of the same, (shown in Figs. 6 and 12,) into which a stationary stud or pin projecting from a part of the swivel-frame T is fitted to prevent it from rotating. A rotary movement of A^2 is prevented by the nut c^3 , A^2 being slotted to allow it to pass through, as shown at S , Fig. 5. A^3 is prevented from rotating by the jointed brace E . (Shown by dotted lines in Fig. 3, and by full lines in Figs. 10 and 11.) This brace has the form of a toggle-joint, one arm of which is pivoted to the seat and the other to the frame, these pivotal points being some distance from the axis of the supporting-column.

The parts C , C^1 , C^2 , C^3 and a^4 are all operated by a single removable socketed crank made to fit them. D^1 represents the movable platform, carrying the foot-rest D^2 , which is jointed to it at D^3 , so as to turn thereon, as shown in Figs. 1 and 3. The platform is moved up or down by means of the gearing e , shaft C^3 , and screws e^1 , arranged substantially as shown. The foot-rest D^2 is an angle-plate, the curved side s of which affords the necessary support for the feet of adults when the arms s^2 of the foot-rest are extended horizontally, as shown in full lines in Fig. 1. The side s^1 forms the support for the feet of children, the foot-rest being turned up into a vertical position, as shown in full lines in Fig. 3, when a child is being operated upon.

E^1 is an extension-brace, composed of the sleeve e^2 and sliding piece e^3 , e^2 being jointed to the lower part of the chair at E^2 , and e^3 to a stationary point on the base at E^3 . Its object is to hold the chair more firmly, and to prevent any rotary motion of the same, as hereinbefore mentioned.

F represents the movable arms. They are connected to the sides of the chair by the parallel jointed bars $f\ f$, and are held in their upward position by the pawl f^1 , which catches into a notch in the top of the sides A . There may be one or more of said notches, so that the height of the arms may be regulated thereby. The operation of the same is obvious. b is a foot-step for adjusting the rotary position of the chair. This foot-step or foot-lever is a spring-bar firmly secured at one end to the pedestal of the chair, pressing upward, and connected to a bolt, b^1 , which catches into holes in the disk b^2 on the bottom of the swivel-frame T . A pressure upon the foot-step b releases b^2 , and allows the chair to be rotated to the position desired. When b is released it springs up and forces b^1 into place,

thereby holding the chair firmly. The curved extension sides of the chair are shown by the letters F^1 . F^2 represents the movable back of the chair. It is jointed to the base frame or sides at f^2 , and is adjusted backward or forward by the shaft C^1 , gearing f^3 , (shown in Fig. 2,) and screws f^4 . (Shown in Figs. 1, 2, and 3.) G is the head-rest, connected to a ball, G^1 . G^2 is a socket for holding G^1 . It is formed of two parts, $g\ g^1$, held loosely together by the ring G^3 . The socket G^2 is formed by the concaved heads of the bars $g\ g^1$, the ring G^3 being firmly secured to one of these concaved heads, and so fastened to the other, by making the screw-holes slightly larger than the screws, that the said heads may have a slight play to enable them to be opened and closed, according as the ball of the head-rest requires to be held rigidly or to be released for the adjustment of the head-rest. $g\ g^1$ are kept apart at g^2 by means of a spring. They pass through the part g^3 , which is held to the bar H , where it passes through R by the cam-lever H^1 , as shown, and by which it is adjusted. H^2 is a cam-lever for adjusting the bar H and holding it. The bar H is serrated, as shown at h , so that it may be held more firmly, as hereinbefore mentioned. I , Fig. 3, represents the inside hinged back. It is hinged at the top. $J\ J$ represent the stationary studs on the base-frame for keeping it in proper position while the back F^2 is being adjusted.

The head-rest G is kept in its proper vertical position, corresponding to the movement of the patient's head while adjusting the back of the chair, by means of the double-grooved pulley J^1 and K , Figs. 2 and 8, and the cords or cables $J^2\ J^3$. The cord J^3 is fastened to a fixed point, l , on the base-frame, from which it passes around a small pulley at l' ; from thence to the pulley J^1 , upon which it passes partly around and is fastened thereto. Cord J^2 passes partly around the larger pulley K , Figs. 2 and 8, to which it is connected, and from thence it passes down nearly to the bottom of the bar H^3 , to the arm h' of which it is fastened, as shown in Fig. 8. $j\ j$ represent springs, which draw the bar H^3 downward.

The bar H , carrying the head-rest G , is adjustably connected to the bar H^3 , in manner hereinafter fully described; but when properly adjusted the bar H and the bar H^3 constitute in effect a single piece, moving together in response to the action of the springs, pulleys, and cords just alluded to, on the adjustment of the back. The bar H^3 slides in ways on the back F^2 .

It will be readily seen that in a movement of the back F^2 from its nearly vertical position to that shown by the dotted lines, Fig. 1, the point l' will move toward l , thereby giving slack to J^3 , which would cause the pulleys J^1 and K (which are fastened together) to rotate in the direction of the arrow by the action of the springs $j\ j$ and cord J^2 , or its equivalent, thus causing the head-rest to descend, and that a reverse movement of the back will in

a similar manner, by reversing the action of the several parts, cause the bar H and the head-rest to move upward.

The necessary extent of such movement, so that the head-rest may be kept in its proper position with the head of the patient while adjusting the back of the chair, is obtained by making J^1 smaller than K. A similar result may be reached by changing the distance between the parts f^2 and l' .

At Fig. 9 a top view of the mechanism for clamping and holding the bar H is shown.

The part W' is grooved to correspond with the grooves in H. W is the upper end of the bar H^3 , which, as above stated, slides on the back F^2 , and to W' , loosely connected to W, by lugs passing through corresponding slots in the latter, (see Figs. 8 and 9,) the springs j are fastened, which are so placed as to draw downward and forward, so that when the cam-lever H^2 is raised up the clamping device springs apart, and the head-rest bar H may be easily raised or lowered, so as to meet the heights of different persons.

This arrangement enables the operator to adjust the height of the head-rest and hold it firmly in any position, and is entirely independent and separate from the automatic adjustment of the same.

A nut or screw could be used in place of the cam-levers H^1 H^2 , and would answer the purpose very well, but could not be operated quite as quickly.

I do not claim, broadly, a hinged or turn-up foot-rest.

I claim as my invention—

1. In a dental chair, the combination, substantially as specified, of the chair-frame, the pedestal or stand, and the intermediate telescopic columns geared for independent adjustment.

2. The combination of the head-rest bar H, grooved pulley J^1 K, cords J^2 J^3 , and adjustable back F^2 , substantially as and for the purposes described.

3. The adjustable platform D^1 of a dental chair, in combination with the jointed foot-rest D^2 , the supporting-surfaces of which are formed by the respective sides s and s^1 of an angle-plate, or its equivalent, as and for the purposes set forth.

4. In a dental chair, the adjustable or movable arms F, jointed parallel bars f f , and pawl f^1 , combined and arranged with the sides of the chair, substantially as and for the purposes specified.

5. The extension-brace E^1 , consisting of the parts e^2 e^3 , and combined with the swivel-bar T, and the lower part of the chair at E^2 , substantially as and for the purposes described.

6. The jointed brace E, in combination with the seat A^4 and the base-frame of the moving portion of the chair, for the purposes specified.

7. The head-rest G, provided with a ball, G^1 , loose ring G^3 , and parts g g^1 , in combination with the part R of the bar H, bolt g^3 , and tightening-lever H^1 , for the purposes described.

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