



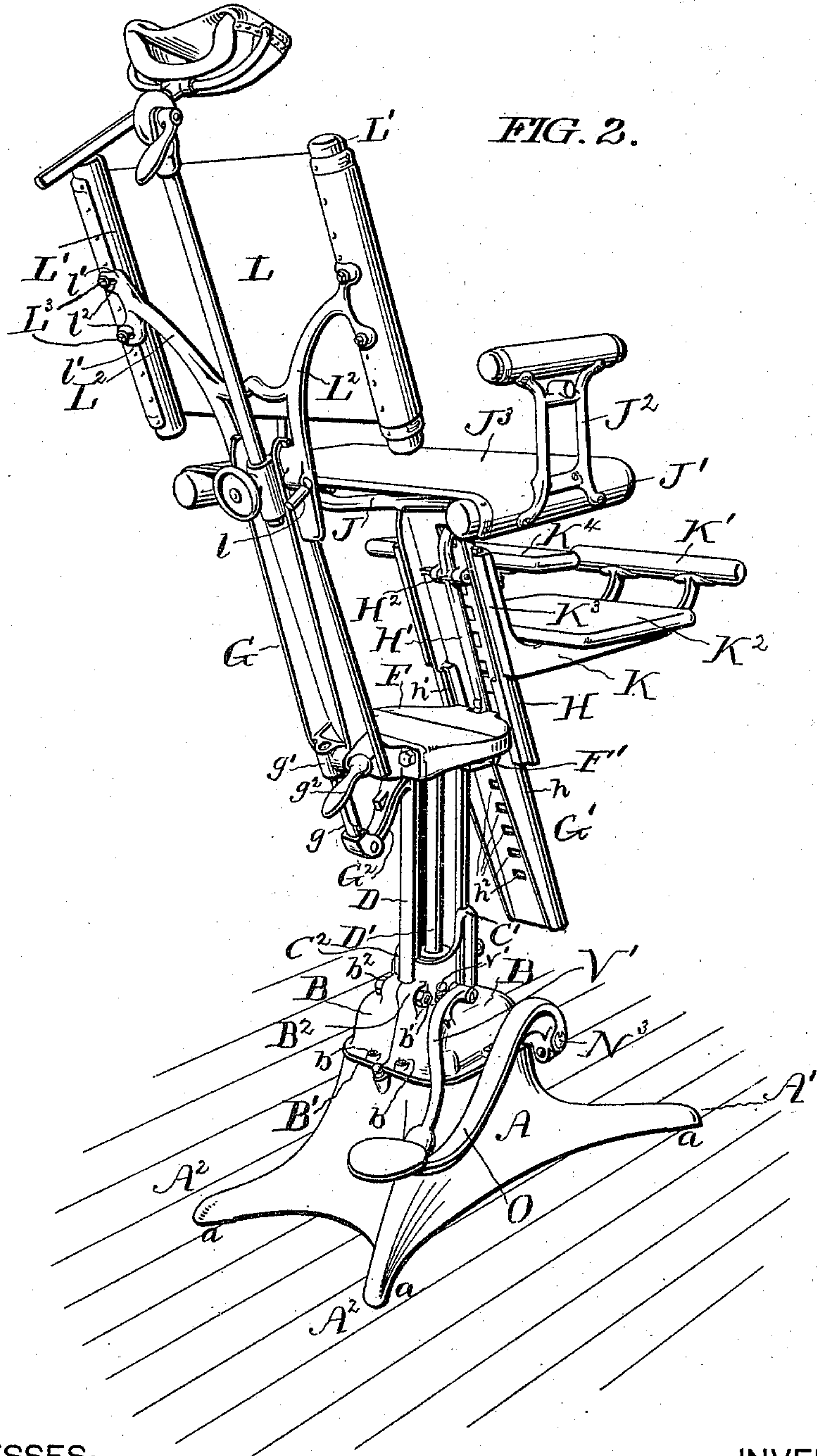
(No Model.)

6 Sheets—Sheet 2.

A. W. BROWNE.  
DENTAL CHAIR.

No. 573,133.

Patented Dec. 15, 1896.



WITNESSES:

*H. R. Barber*  
*Edw. F. Simpson, Jr.*

INVENTOR:

*A. W. Browne*  
*By atty L. H. Peyton.*

(No Model.)

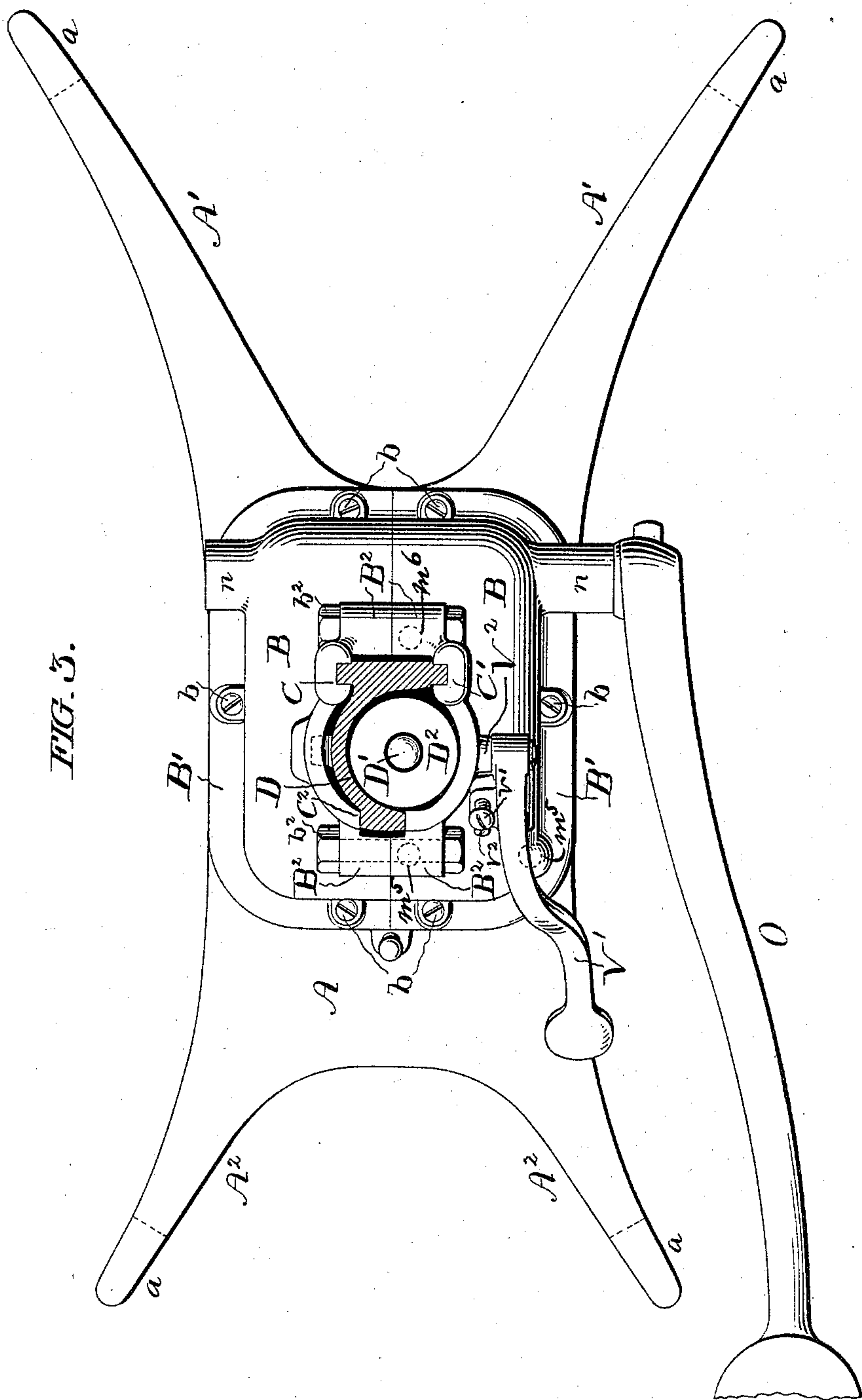
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FIG. 3.



WITNESSES:

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INVENTOR:

*A. W. Browne*  
*By Atty. J. H. Peyton.*



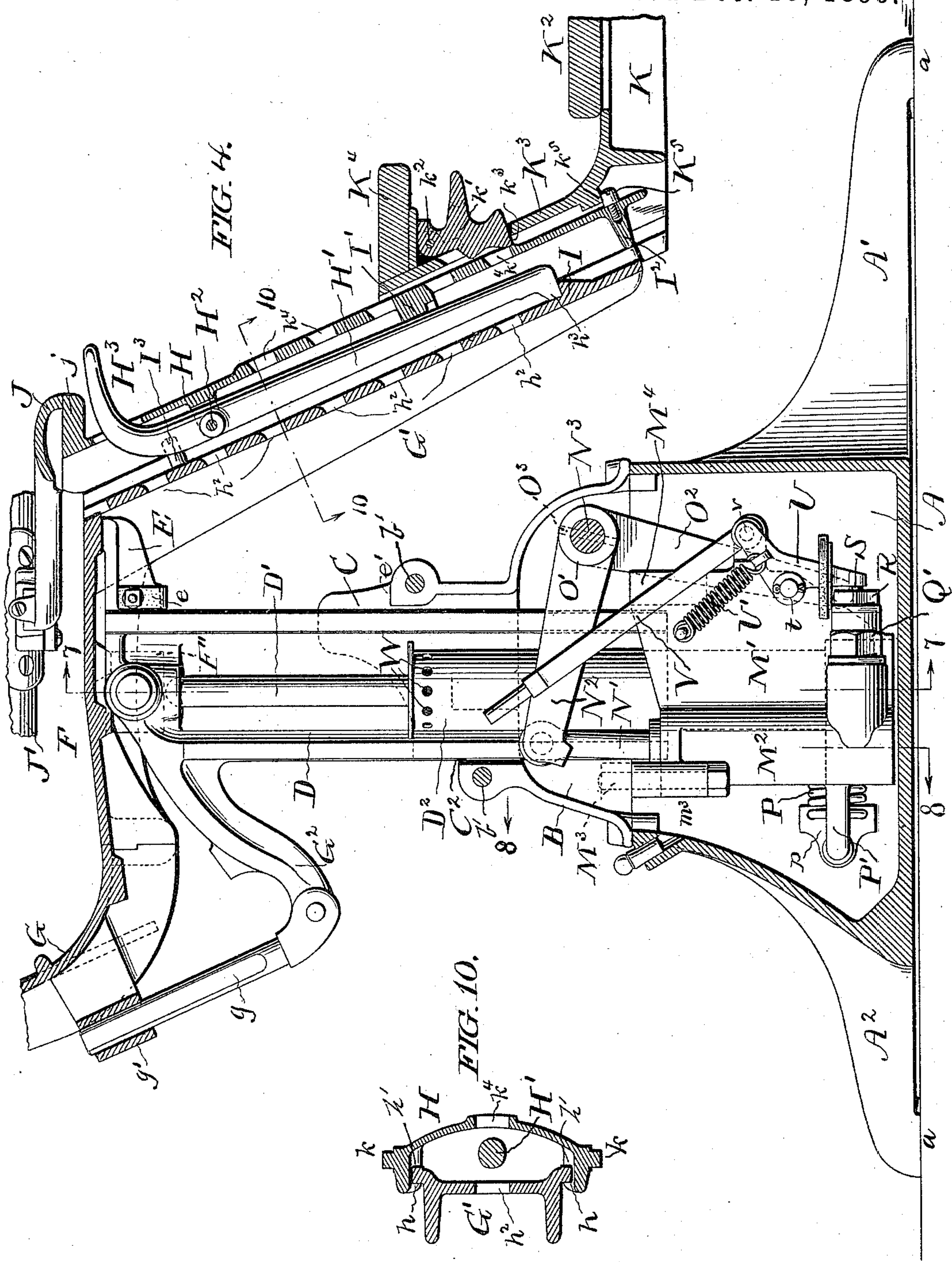
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**INVENTOR:**

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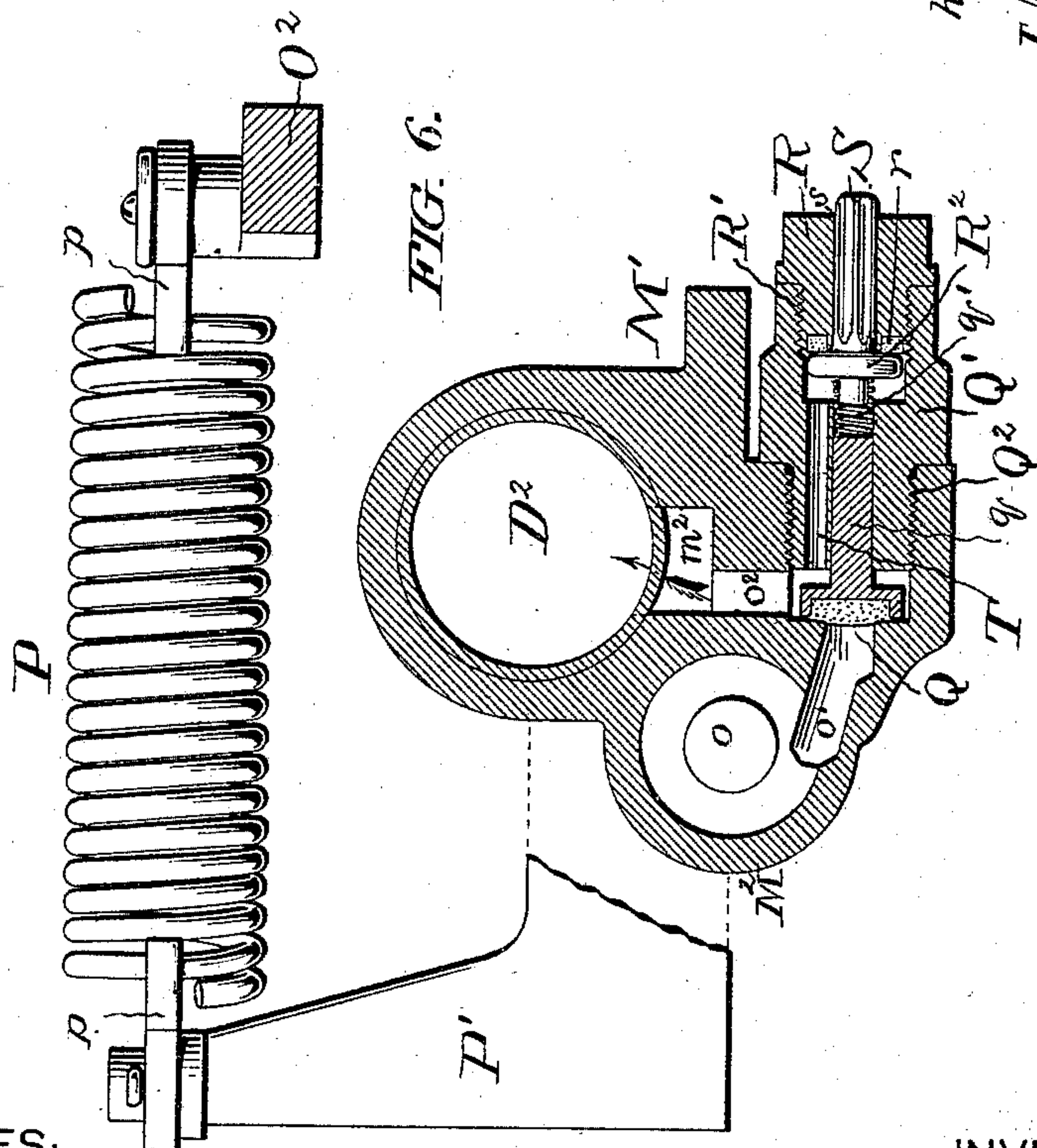
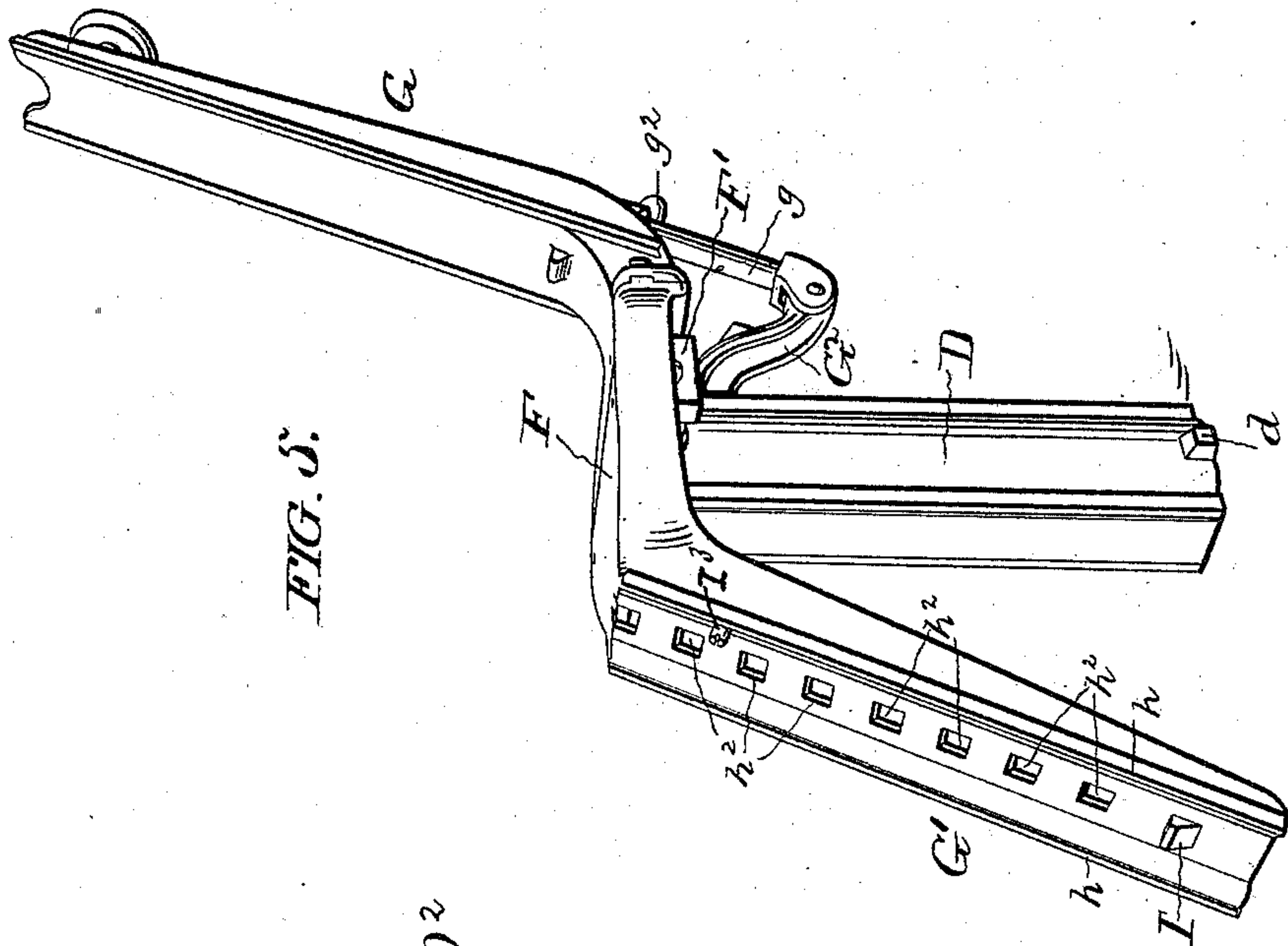
(No Model.)

A. W. BROWNE.  
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6 Sheets—Sheet 5.

No. 573,133.

Patented Dec. 15, 1896.



WITNESSES:

H. R. Barber  
Edw. F. Simpson, Jr.

INVENTOR:

A. W. Browne  
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# UNITED STATES PATENT OFFICE.

ARTHUR W. BROWNE, OF PRINCE'S BAY, NEW YORK, ASSIGNOR TO THE  
S. S. WHITE DENTAL MANUFACTURING COMPANY, OF PHILADELPHIA,  
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## DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 573,133, dated December 15, 1896.

Application filed April 15, 1896. Serial No. 587,693. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR W. BROWNE, a citizen of the United States, residing at Prince's Bay, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Dental Chairs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain improvements, as hereinafter claimed, applicable to dental chairs of the class in which provision is made for imparting a wide range of vertical adjustment to the seats and other parts.

In the accompanying drawings, which represent a suitable embodiment of my improvements, Figure 1 is a front and side perspective view, and Fig. 2 a rear and side perspective view, of the complete chair on a smaller scale than the remaining views. Fig. 3 is a view, partly in plan and partly in horizontal section, beneath the top of the raising and lowering support. Fig. 4 is a view, partly in elevation and partly in vertical central section, omitting various portions of the chair. Fig. 5 is a view in perspective, on a smaller scale than that of the preceding view, of the chair-body and its vertically-adjustable support. Fig. 6 is a view, on a larger scale, partly in plan and partly in horizontal section, on the line 6 of Fig. 7, showing details of the devices for raising and lowering the chair-body support. Fig. 7 is a view, partly in rear elevation and partly in vertical section, on the line 7 of Fig. 4. Fig. 8 is a view, partly in front elevation and partly in vertical section, on the line 8 of Fig. 4, showing details of the pump mechanism. Fig. 9 is a view in horizontal section showing details of the back-pad-tightening devices. Fig. 10 is a section on the line 10 of Fig. 4. Fig. 11 is a view of the pedestal-cap inverted.

A hollow pedestal or base A, having a detachable cap or dome, constitutes a reservoir for oil or other suitable liquid, and is provided with four supporting-legs arranged in diverging front and rear pairs, the front legs A' A' being longer than the rear legs A<sup>2</sup> A<sup>2</sup>. Each

leg terminates in a foot *a*, and the under surfaces of the legs from their feet to the hollow pedestal are in the horizontal plane of the bottom of the pedestal and but slightly above the plane of the under or bearing surfaces of the feet, so that the pedestal and its legs may be brought close to or caused to bear slightly upon the carpet upon a floor as the feet indent or sink into the carpet, thus excluding dust, &c., from beneath the pedestal and its legs. Except that its corners are rounded the pedestal, as shown, is rectangular in horizontal section. The hollow cap or pedestal-dome is made in two sections B B, detachably secured upon the pedestal by means of a number of screws *b*, passing through a flange B' of the cap and suitably engaging the pedestal, as will readily be understood. The two sections of the cap are rigidly and strongly detachably connected with each other by means of clamp-bolts *b'* *b'*, passing through perforated lugs B<sup>2</sup> B<sup>2</sup> of the cap-sections and secured by nuts *b<sup>2</sup>* *b<sup>2</sup>*.

The sectional pedestal-cap is provided with suitable guideways C C' C<sup>2</sup>, (plainly shown in Fig. 3,) in which a raising and lowering support D is adapted to be vertically adjusted. This support partially surrounds a plunger D' and its cylinder D<sup>2</sup>, which constitute parts of suitable mechanism for raising and lowering the support, the guideways C C' C<sup>2</sup> for which are at opposite sides of the cylinder and afford a strong and steady bearing effectually preventing vibration of the support. Upward movement of the support is limited by contact of a lug *d* thereon with a shoulder *d'* at the top of a recess *d<sup>2</sup>* in the pedestal-cap for this lug to move in. Downward movement of the support is limited by contact with the pedestal-cap of a buffer *e*, of leather or equivalent material, secured to an arm or lateral extension E at the front side of the top of the support. The buffer comes in contact with the pedestal-cap at *e'* between upwardly-projecting portions of the guideways C C' in the cap.

The support D terminates at top in the cross-arm journal or trunnions E', upon which is suitably mounted a chair body or frame F, so as to be capable of tilting or vertically



rocking. As shown, the chair-frame is mounted upon the trunnions  $E'$  by means of bearings formed by blocks  $F'$   $F'$ , detachably secured to the underside of the body by screws.

5 The chair body or frame represented comprises the inclined back frame or upper portion  $G$  and the inclined lower portion  $G'$  for supporting a seat and a foot-board or platform. For convenience of manufacture the  
10 parts  $F$  and  $G'$  are cast together and the back frame portion  $G$  made separate and rigidly bolted to the part  $F$ , so that in operation the entire chair-frame is adapted to tilt, as though in one casting, about its trunnion connection with its support. The forward-tilting  
15 movement of the chair-body is limited by its contact with the arm  $E$  of the support, and its rearward-tilting movement is limited by its contact with a downwardly and rearwardly extending arm  $G^2$  of the support. A link-rod  $g$ , pivoted to the arm  $G^2$  and adjustably engaging a socket  $g'$  in the chair-body back, and a set-screw  $g^2$  for clamping the link-rod in its socket provide for adjusting the inclination of the body in obvious manner.  
25

A carrier  $H$  for a suitable chair-seat is adjustable up and down and adapted to be supported at any desired height upon the lower portion  $G'$  of the chair frame or body in the  
30 following way: The seat-carrier has guideway connection with the chair-frame by means of guide-ribs  $h$   $h$  upon the frame engaging with guide-grooves  $h'$   $h'$  of the carrier, so that the carrier may be slid up and down the frame. Holes  $h^2$  in the frame extending in  
35 a line longitudinally thereof are adapted to be engaged by a detent-lug  $h^3$  at the lower end of a lever  $H'$ , pivoted at  $H^2$  to the inner surface of the carrier. Above its pivot the  
40 detent-lever projects forwardly through an opening in the carrier, and in this way there is provided a handle  $H^3$  by which to rock the detent-lever and disengage its lower end or lug from the frame. The detent-handle also  
45 serves as a means for supporting the carrier in raising and lowering it and is located out of the way beneath the seat, and so protected against contact with the person or clothing. The frame is slightly hollowed out or made  
50 of shallow trough shape upon its front surface, and the carrier is also trough-shaped upon its rear surface, so as to provide ample space for the rocking movements of the detent-lever.

55 From the above description it will be seen that the seat-carrier may quickly be raised or lowered; that upon the release of the gravitating detent-lever the carrier becomes automatically locked with the frame; that by providing a long detent-lever pivoted near its upper or handle end the handle is brought to a height most convenient to reach, and that but slight rocking movement is required to disengage the detent-lug, and that by providing  
60 a long carrier a wide range of adjustment is attained without necessitating the extension of the guideway upon the frame above the

level of the portion  $F$  of the frame, thus admitting of this guideway being terminated in about the horizontal plane of the jointed connection of the frame with its support. 70

Downward movement of the seat-carrier is limited by contact of the lower end or lug of the detent-lever with a shoulder or stop-lug  $I$  on the frame, and the rocking movement of  
75 the lever is limited by a stop-lug  $I'$  on the carrier, thus insuring engagement of the lever with the stop  $I$  at the limit of descent of the carrier. Upward movement of the carrier is limited by a lug  $I^2$  on the inside of the carrier at its lower end coming in contact with  
80 a stop-screw  $I^3$  on the frame. (See Fig. 4.) To provide for securing this stop-screw in place and to permit of its removal for disconnecting the parts, a hole  $i$ , Fig. 1, is made in  
85 the carrier, through which the screw may be secured in place and detached when this hole is made to register with the screw-hole in the frame.

Any suitable seat-frame and seat may be  
90 appropriately supported by and partake of the movements of the carrier. As shown, the construction of parts and their connection with the carrier are as follows: A forked bracket  $J$  is properly attached, as by screws,  
95 to the upper flanged end  $j$  of the carrier, and the forks of the bracket are secured to the seat-frame bars  $J'$   $J'$ , which are provided with the arms  $J^2$   $J^2$  and have secured to them the seat  $J^3$ , of carpet or other flexible material. 100

A frame  $K$ , provided with a foot-rest  $K'$  and foot-board or platform  $K^2$ , has adjustable supporting connection by way of its carrier  $K^3$  with the chair-frame through the medium of  
105 the seat-carrier  $H$ , so as to partake of the movements of this carrier  $H$ . The carrier  $K^3$  is also adjustable up and down independently of the adjustments of the seat-carrier and is provided with the child's foot-board  $K^4$ . The guideway connection of the foot-board carrier  
110  $K^3$  with the seat-carrier is substantially the same as the connection between the seat-carrier and the chair-frame, the foot-board carrier being provided with guide-grooves for engaging with guide-ribs  $k$   $k$  at the edges of  
115 the seat-carrier. The range of adjustment of the foot-board carrier on the seat-carrier is shorter than that of the latter carrier on the chair-frame, and the detent-lever  $k'$  for engaging and disengaging the two carriers is  
120 shorter than the detent-lever for connecting and disconnecting the seat-carrier and frame. The detent-lever is pivoted to the foot-board carrier at  $k^2$ , projects through an opening in the carrier, and is provided with a handle at  
125 its outer end and a detent-lug at its inner end. This lug  $k^3$  is adapted to engage holes  $k^4$  in the seat-carrier, the operation being essentially similar to that already described with reference to the operation of adjusting  
130 the seat-carrier. Stops  $K^5$   $k^5$ , Fig. 4, limit downward movement of the foot-board carrier on the seat-carrier.

A suitable back-pad is adapted to be ad-



justed up and down the back portion of the chair-frame and to be clamped in its position of adjustment. As shown, the back-pad L consists of a strip of flexible material, such as carpet, fixed to side bars  $L' L'$ , which are attached to the arms  $L^2 L^2$  of a forked carrier adapted to slide up and down and to be clamped to the upper portion of the chair-frame by the clamp-screw  $l$ . To stretch the back-pad, the connection between one of the side bars  $L'$  and its supporting-fork of the carrier is made adjustable in the following way: Lugs  $l' l'$  at the outer end of the carrier-fork are provided with slots  $l^2 l^2$ , (see Figs. 2 and 9,) and bolts  $L^3 L^3$ , one for each slot, are each engaged with a nut  $l^3$ , secured in the side bar. By loosening the bolts the bar  $L'$  may be given a partial turn to draw taut the back-pad, and the bolts be then tightened.

The plunger  $D'$  of the main raising and lowering mechanism has thrust bearing at its upper end at  $M$  against the upper end or head of the main support  $D$ . The plunger works as a piston-rod in the cylinder  $D^2$ , being provided at its lower end with a suitable piston-head fitting the cylinder liquid-tight. The cylinder is open from top to bottom and is supported within the pedestal by being screw-attached at its lower end in a socket  $m$  in a supporting-frame  $M'$ , which has detachable connection with the pedestal, as farther on to be explained. The socket into which the cylinder is screwed is provided with a shoulder  $m'$ , against which the lower end of the cylinder seats. In this way the cylinder is closed at bottom with the exception of a single port  $m^2$  in the supporting-frame socket for the flow of liquid to and from the cylinder, as in turn to be explained. A pump-cylinder  $M^2$ , rigid with the supporting-frame  $M'$  and most conveniently formed by being cast integral therewith, is located at the side of the plunger-cylinder. At and projecting above the top of the pump-cylinder are two tubular lugs  $m^3 m^3$ , Figs. 4 and 8, for connecting the supporting-frame with the pedestal. These tubular lugs are bolted by bolts  $m^5 m^5$  to and beneath two bracket-lugs  $M^3 M^3$ , Fig. 11, on one section of the pedestal-cap, and the supporting-frame is further connected with this cap-section by means of a bolt  $m^6$  engaging a tubular lug  $M^4$  of the frame with a bracket of the cap at  $m^4$ . (See Figs. 4 and 11.) A very strong and simple separable connection is thus made. The bolts  $m^5 m^5 m^6$  are indicated by dotted lines in Fig. 3. The pump-piston  $N$  is pivotally connected with its rod  $N'$ , which at its upper end is jointed to the outer end of an arm or crank  $N^2$ , which has detachable connection with a rock-shaft  $N^3$ . This rock-shaft is mounted to rock in bearings  $n n$  in the two sections of the pedestal-cap. To one end of the rock-shaft is detachably fastened an actuating-lever  $O$ , adapted to be operated by the foot. The connection between the rock-shaft and its crank-arm  $N^2$  is through the medium of a sleeve  $O'$ ,

extending between the bearings  $n n$  and surrounding the rock-shaft, to which the sleeve is detachably secured, so as to prevent turning or endwise movement of it about the rock-shaft, by means of cross-pins, one of which is shown in dotted lines at  $O^3$ , Fig. 4. A depending crank-arm  $O^2$  is also connected with the rock-shaft through the medium of the sleeve  $O'$ .

The two crank-arms  $N^2 O^2$  are formed with the sleeve at the opposite ends thereof. A spring  $P$  has connection at one end with the lower end of the crank-arm  $O^2$  and at its opposite end with a bracket-arm  $P'$ , rigid with the supporting-frame  $M'$ . This spring serves to normally hold the outer end of the actuating-lever in its most elevated position and to return it to such position after being depressed by the foot. The upward movement of the outer end of the actuating-lever is limited by contact of the upper end of the piston-rod  $N'$  with the pedestal-cap, and downward movement imparted to the outer end of the lever by the foot is limited by contact of the outer end of the crank-arm  $N^2$  with the top of the pump-cylinder. The manner of connecting the spring  $P$  with the supporting-frame bracket  $P'$  and crank  $O^2$  is such as to permit of varying the tension of the spring as may be found desirable. Link-plates  $p p$  of similar construction are jointed, respectively, to the bracket  $P'$  and crank  $O^2$ , and the opposite ends of the spring pass through holes or eyes in the plates. By turning or screwing the spring through the link-holes its tension may be increased or lessened, as will be obvious.

An upwardly-opening puppet-valve  $o$ , Fig. 8, in the bottom of the pump-cylinder admits oil from the pedestal-reservoir to the cylinder upon the upstroke of the pump-piston. Upon the downstroke of the piston the valve closes and the oil is forced from the pump-cylinder by way of the port  $o'$ , passage  $o^2$ , and port  $m^2$  to the plunger-cylinder  $D^2$ , beneath the piston therein, to impart upward movement to the main support. (See Fig. 6.) During the upstroke of the pump-piston communication between the ports of the pump-cylinder and plunger-cylinder is closed by means of a valve  $Q$ . Fig. 6 shows this valve in position to close the port  $o'$ . Repeated operations of the pump-piston serve to elevate the main support, and with it the chair-frame, as far as desired by the accumulation of oil beneath the plunger-piston. The valve  $Q$  is mounted by its stem  $q$  in a plug  $Q'$ , screwed into a threaded socket  $Q^2$  of the supporting-frame in the pedestal. A spring  $q'$  acts upon the valve-stem with a tendency to keep the valve  $Q$  in position to close the port  $o'$ . A cap or outer plug  $R$  screws into a threaded socket  $R'$  in the outer end of the plug  $Q'$ . A valve-chamber is provided by the plug-socket  $R'$ , and the valve  $R^2$  in this chamber is acted upon by the spring  $q'$  with a tendency to hold it to its packed seat  $r$  on the cap-plug  $R$ . The stem  $S$  of the valve



$R^2$  is longitudinally grooved and is mounted in a hole in the cap-plug by which oil is allowed to escape when the valve  $R^2$  is moved from its seat against the force of its spring.

5 An oil-passage T communicates with the chamber of the valve  $R^2$  and the passage  $o^2$ .

From the above description it will be seen that when the valve-stem S is moved inward and the valve  $R^2$  unseated oil is allowed to  
10 gradually flow from beneath the plunger-piston to the pedestal-reservoir, and the main support, and with it the chair-body, may thus be lowered.

To actuate the valve-stem S and trip or  
15 unseat the valve  $R^2$ , a bell-crank lever U is pivoted at  $t$  to the supporting-frame M' in the pedestal, and the lower arm of this lever is adapted to be rocked against the valve-stem to move it inward. A spring U' has connection at its opposite ends with the upper arm  
20 of the lever and with the supporting-frame M' and normally holds the bell-crank lever out of action. An arm V is jointed at its lower end to the upper end of the bell-crank  
25 lever by a pivot  $v$ , and at its upper end this arm projects through the pedestal-cap in position to be borne upon by a lever V' when depressed by the foot. This lever is pivoted upon a trunnion  $V^2$ , provided on the pedestal-cap. As will be understood by reference  
30 to Figs. 2, 3, and 4, the lever V' acts on the arm V by way of a screw  $v'$ , adjustable in a side lug of the lever. A set-screw  $v^2$  serves to hold the screw  $v'$  in its position of adjustment. The operation of this valve-tripping  
35 mechanism will readily be understood. Obviously the spring U' serves to restore the lever to its normal position when relieved from the pressure of the foot.

40 In order to provide for escape of oil from the plunger-cylinder in event of continued working of the pump after the plunger has reached its highest elevation, outlet-openings W are formed in the cylinder near its top.

45 It will be seen that with the exception of the rock-shaft and its sleeve and arms all the parts inside the pedestal are carried upon the single depending supporting-frame, and that this frame being supported wholly by  
50 the pedestal-cap may readily be placed in position and removed, together with the various parts carried by it, thus greatly facilitating inspection, fitting, and repairing of parts and rendering unnecessary the removal of oil from  
55 the reservoir.

By constructing the frame with the intermediate portion F horizontal, or approximately so, and the rear and front portions G G' projecting, respectively, upwardly and  
60 downwardly from the rear and front of the intermediate portion and provided with their respective guideways I am enabled in simple and inexpensive manner to adjustably support the chair-seat upon the front or lower  
65 portion G' of the frame by way of a carrier engaging said portion and to adjustably support the back-pad upon the back or upper

portion G of the frame by way of a carrier engaging it. It will be seen that the narrow or bar-like portions of the frame are respectively centrally arranged relatively to those  
70 portions of the carriers which engage them, and that the carriers are thus adapted to be extended laterally and forwardly without obstruction as far as required to best suit them  
75 to perform their functions.

I claim as my invention—

1. The combination, in a dental chair, of the pedestal provided with the detachable cap having the guideways, the cylinder, the plunger vertically adjustable in the cylinder, and the support for the chair-frame partially surrounding the cylinder and adjustable in the  
80 guideways of the pedestal-cap, substantially as set forth.

2. The combination of the pedestal, its detachable sectional cap having the guideways, the cylinder, the plunger adjustable in the cylinder, and the support actuated by the plunger and adjustable in the guideways in  
90 the pedestal-cap upon opposite sides of the cylinder, substantially as and for the purpose set forth.

3. The combination of the raising and lowering support, means for actuating it, the  
95 chair-frame mounted to rock on the support and provided with the seat-supporting portion extending downwardly from about the level of the jointed connection of the frame with its support, the chair-seat, its long carrier having guideway connection with said  
100 downwardly-projecting portion of the frame and adjustable up and down thereon, and the detent devices for adjustably engaging the carrier with the frame, substantially as and  
105 for the purpose set forth.

4. The combination of the raising and lowering support, the chair-frame partaking of the movements of the support and provided with the downwardly-extending seat-supporting  
110 portion, the chair-seat, its carrier adjustable up and down upon the downwardly-extending portion of the frame, means for securing the seat-carrier in its position of adjustment, the foot-board provided with the  
115 carrier adjustable up and down the seat-carrier, and means for securing the foot-board carrier in its position of adjustment upon the seat-carrier, substantially as set forth.

5. The combination of the forked back-pad  
120 carrier, the flexible pad, its side bars having connection with the carrier-forks, the clamp-bolts engaging with one of said side bars, and the slotted lugs by which said bar is adjustably connected with the carrier-fork by the  
125 clamp-bolts, said bar adapted to be partially rotated when the clamp-bolts are moved in the slots of the lugs, substantially as set forth.

6. The combination of the pedestal constituting a liquid-reservoir and provided with the detachable cap, the supporting-frame within the pedestal and detachably connected with the cap, and the raising and lowering  
130



mechanism carried by said frame within the pedestal and removable therefrom with the pedestal-cap, substantially as set forth.

5 7. The combination of the chair-frame, the pedestal constituting a liquid-reservoir and provided with the detachable cap, the vertically-adjustable support for the chair-frame having guideway connection with the pedestal-cap, the plunger for actuating the support, 10 the plunger-cylinder, the pump, the valve mechanism for the pump and cylinder, and the supporting-frame within the pedestal and carried by its cap and serving to support the plunger-cylinder, the pump, and the valve 15 mechanism, substantially as and for the purpose set forth.

8. The combination of the chair-frame hav-

ing the upwardly-projecting back portion, the downwardly-projecting front portion and the intermediate portion, the raising and lower- 20 ing support upon which the chair-frame is mounted by way of its intermediate portion to rock, the seat, its carrier having engagement with and vertically adjustable upon the front portion of the frame, the back-pad, and 25 its carrier having engagement with and vertically adjustable upon the back portion of the frame, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR W. BROWNE.

Witnesses:

SEYMOUR CASE,  
M. A. COLE.