

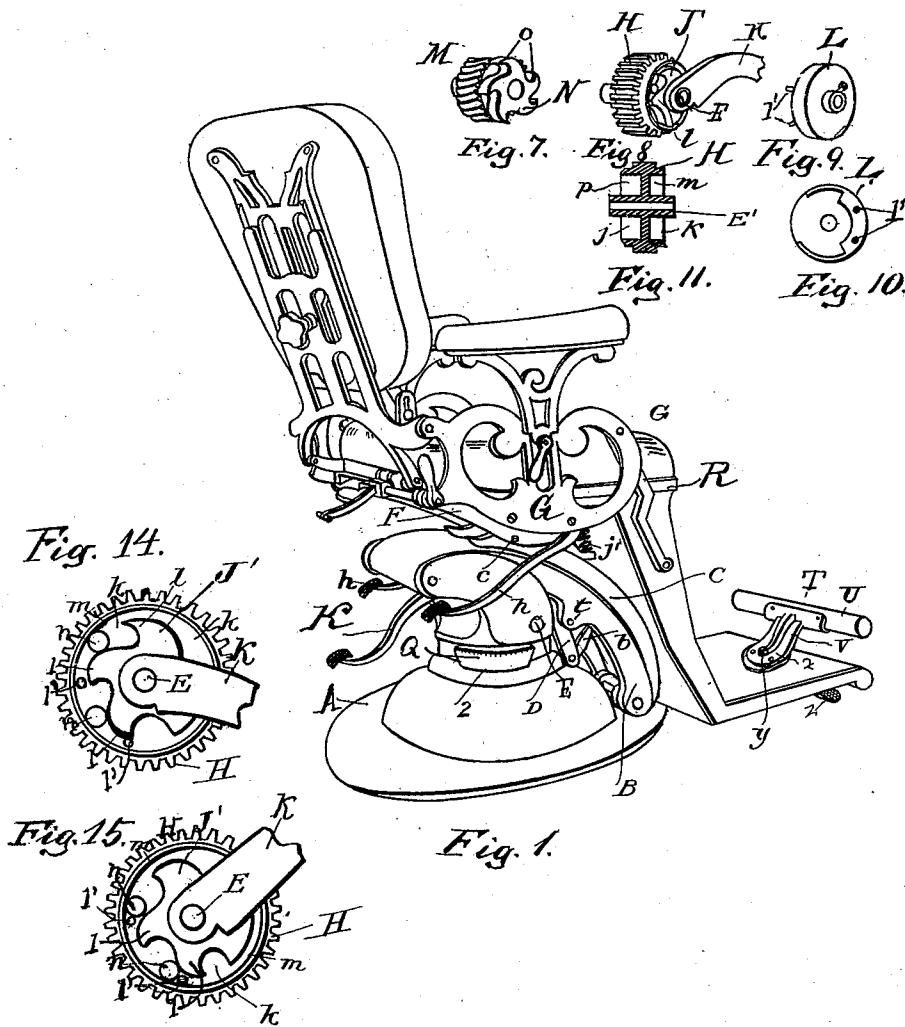
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5 Sheets—Sheet 1.

A. P. GOULD.
SURGICAL AND DENTAL CHAIR.

No. 540,832.

Patented June 11, 1895.



WITNESSES

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Ben H. Miller

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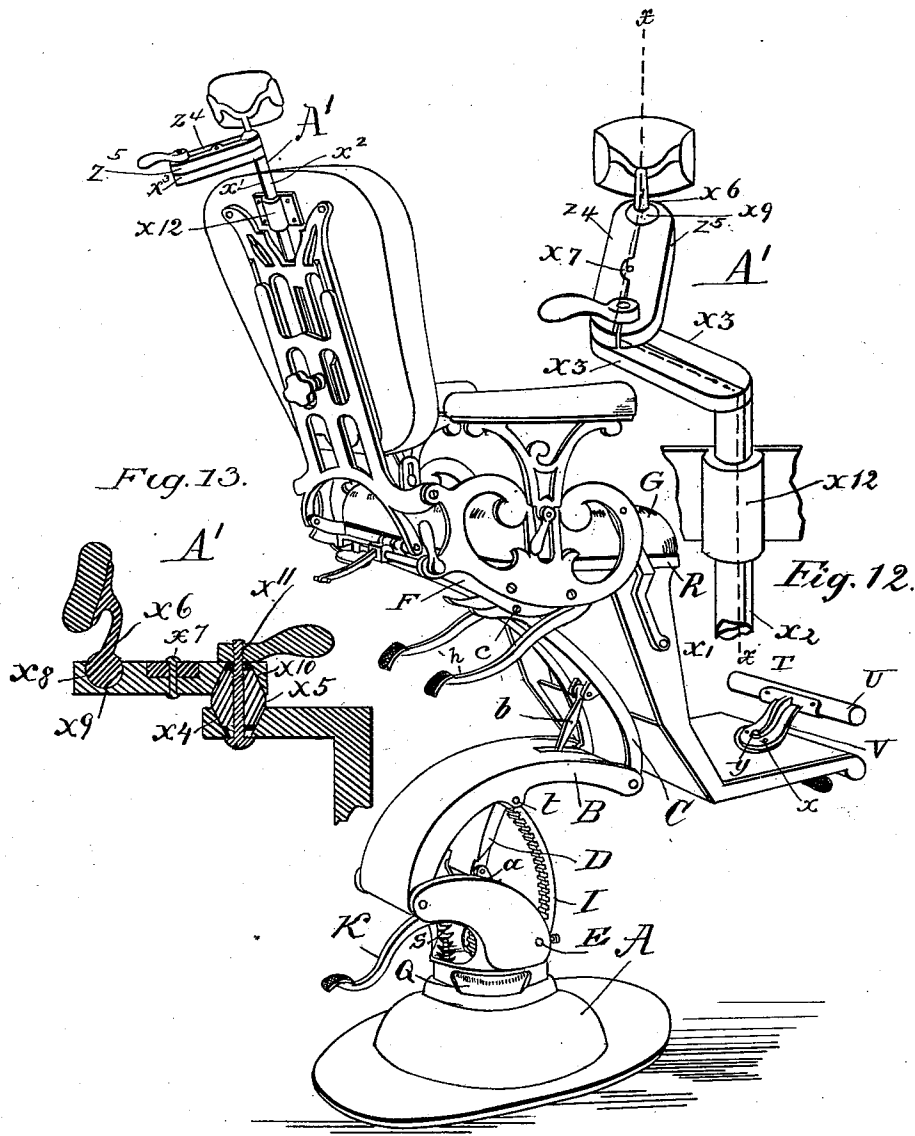
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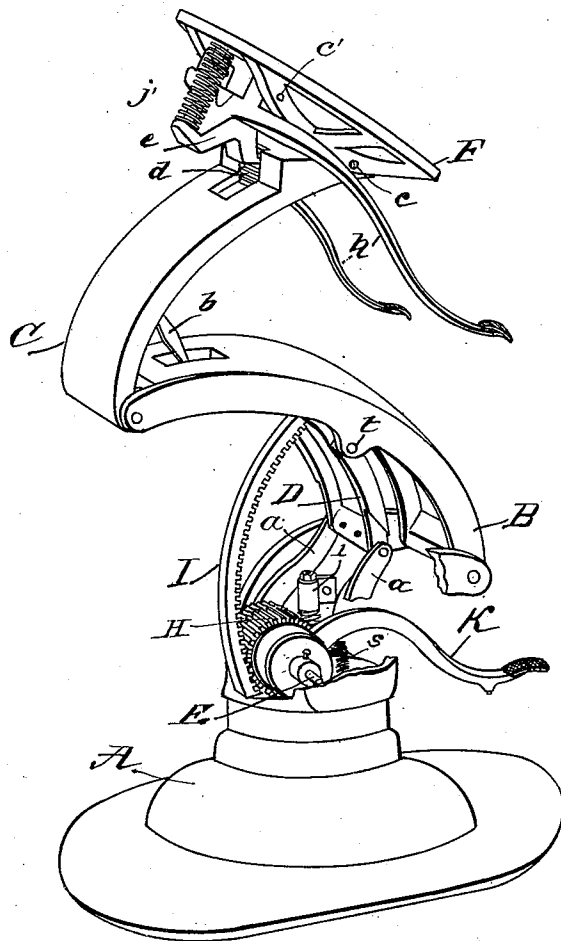


Fig. 3.

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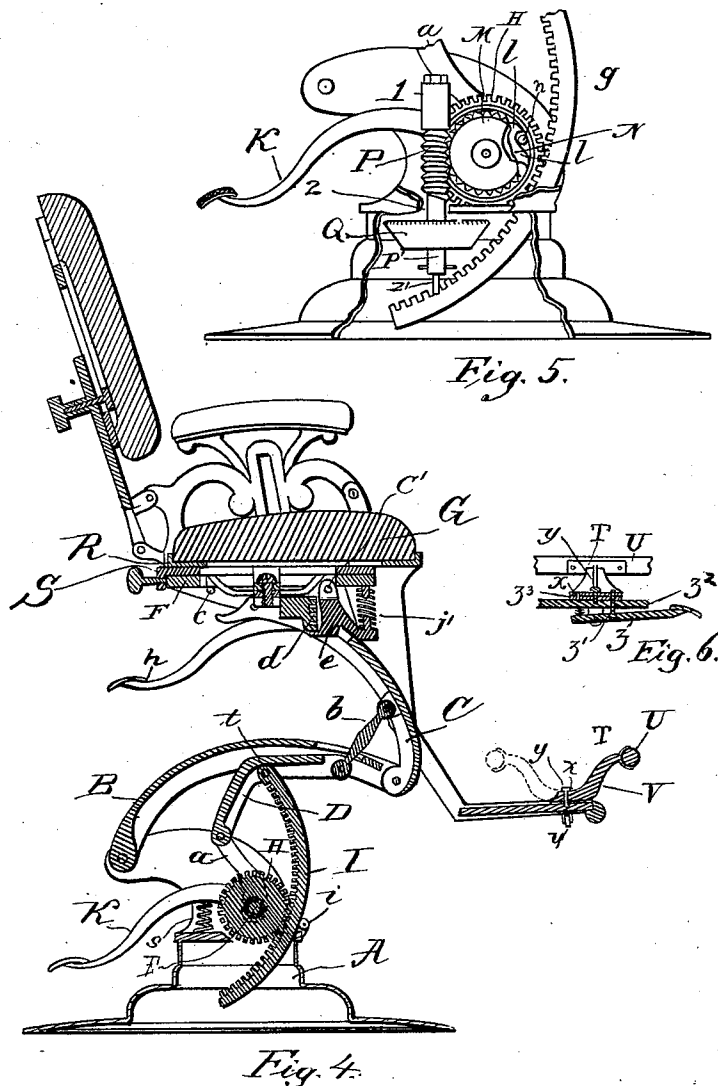
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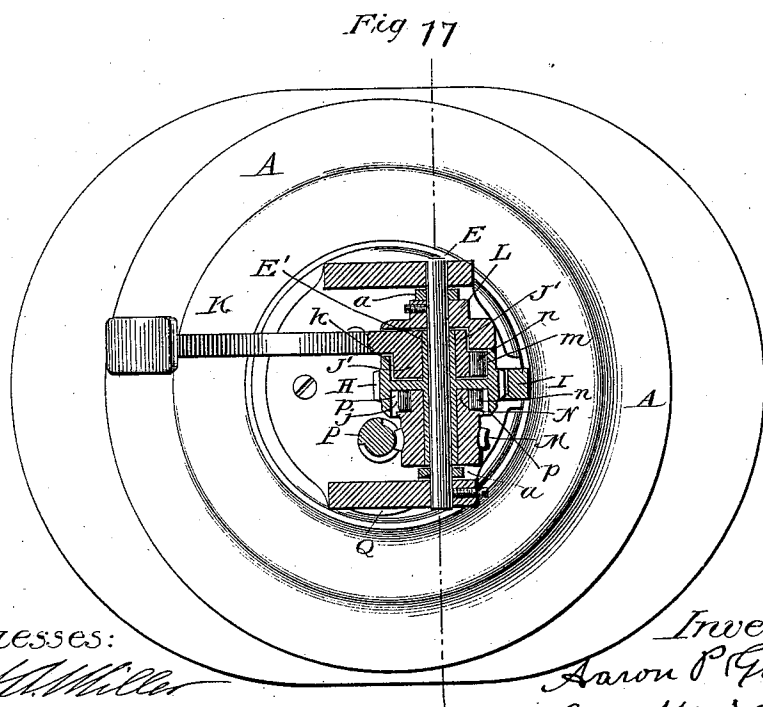
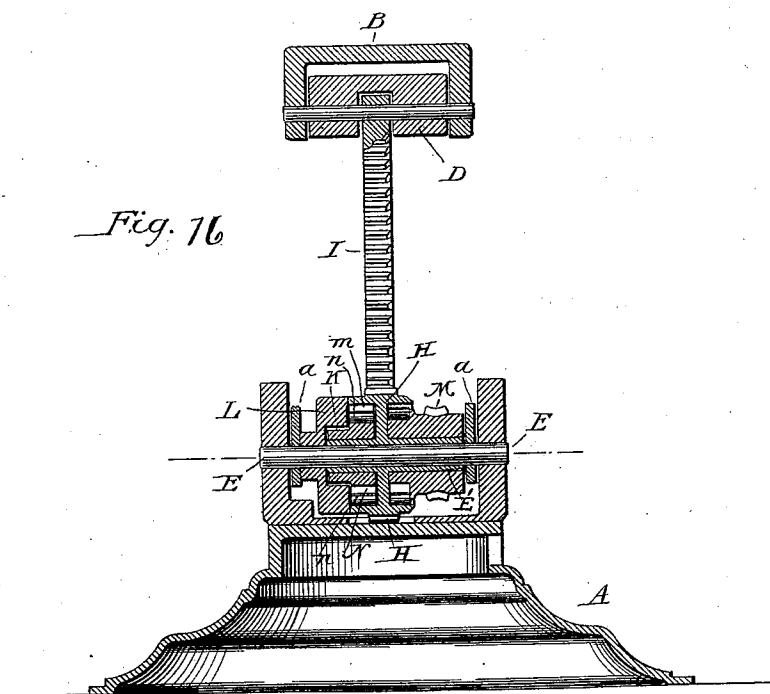
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UNITED STATES PATENT OFFICE.

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SURGICAL AND DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 540,832, dated June 11, 1895.

Application filed November 16, 1893. Serial No. 491,163. (No model.)

To all whom it may concern:

Be it known that I, AARON P. GOULD, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have invented a new and useful Improvement in Surgical and Dental Chairs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in surgical and dental chairs, and consists in providing means for raising and lowering the body of the chair, for supporting it at desired elevation and for securing it in vertical adjustment.

With these ends in view my invention consists of certain features of construction and combination of parts, as will hereinafter be described, and pointed out in the claims.

Figure 1 of the accompanying drawings is a view in perspective of the chair in low normal position from the right rear. Fig. 2 is a similar view showing the chair-body raised to its highest position. Fig. 3 is a similar view of the parts in elevated position with the circular body or seat support tipped back and the side portion of the frame broken away to disclose the interior parts from left front. Fig. 4 is a vertical section through the center of the parts from front to the rear. Fig. 5 is a side elevation of the base with a part of the base cut away to better disclose the raising and lowering mechanism. Fig. 6 is a section through the locking mechanism of the foot-rest. Fig. 7 is a perspective of the worm-wheel and clutch. Fig. 8 is a perspective of the spur-wheel and lifting devices. Fig. 9 is a similar view of the cap or cover for the lifting device. Fig. 10 is a plan view of the inside of the cap or cover. Fig. 11 is a transverse section of the spur or rack wheel shown in Fig. 8. Fig. 12 is a view in perspective of the head-rest detached. Fig. 13 is a sectional view of the head-rest on the line $x x$, Fig. 12. Fig. 14 is a side elevation showing the position of the clutch-balls as seen when the chair-body is being raised. Fig. 15 is a similar view showing the balls resting on the detaining-pins and the arm portions of the foot-lever clutch about to engage the balls to rotate the clutch-wheel. Fig. 16 is a vertical section

through the base of the chair, the lifting and clutch mechanism, and their connections with the body-supporting frame. Fig. 17 is a transverse section through the lifting and clutch mechanism.

Similar letters and numerals of reference indicate corresponding parts in all of the figures of the drawings.

A represents the base to which is pivotally secured an arm as B, adapted to vibrate vertically over and about the base. To the free end of the arm B is pivotally secured a similar arm C, projected back over the arm B, and adapted for vertical vibration above and about its pivotal connection with the arm B.

About central to the arm B is pivotally secured thereto, an equalizing or sway bar D, that serves to transmit the lifting power or movement from the arm B to the arm C, and to regulate or equalize the vertical movement of the rear end of the arm C, with reference to the movement of the front end of the arm B. The end portions of the bar D are connected to the base, and the arm C by links a b . For the purpose of this application I have shown one end of the link a supported on a non-rotative bar E as shown by the dotted lines Fig. 2, the other end pivoted or hinged to the bar D, and the link b pivotally connecting the bar D to the arm C as shown in Fig. 4.

At the upper end portion of the arm C is provided a circular seat or body support F, pivotally secured by the pivots c to the arm, and adapted to be tipped or rocked about its pivotal connection with the arm; and to secure the support F, and the chair body G, supported thereon in desired adjustment about its pivotal connection with the arm C, a rack d is provided as shown in Figs. 3 and 4, secured to the arm C, and a spring pawl e is pivoted to the support as shown at c' , said pawl having pedals h projected therefrom, by which the operator may disengage the pawl from the rack. The spring j' serves to hold the pawl in engagement with the rack, thereby securing the parts in adjusted position.

To raise the chair body, the spur or rack wheel H is loosely mounted on the non-rotative bar E, secured in the base and hereinbefore mentioned, and rotated on said bar by means of a long hub or sleeve E' , integral

with the wheel, said wheel having engagement with a rack I, the upper end of which has a pivotal engagement with the arm B, the lower end to pass down into the base as shown in Figs. 4 and 5. To hold the rack in engagement with the wheel, a roller as *i* is provided as shown.

The rack wheel H has in its sides, recesses *j*, *k*, as shown in section Fig. 11. In the recesses *k*, and loosely mounted on the sleeve E', is placed a lifting clutch J', having radial arms or portions *l*, so curved as to form wedge like spaces between the arms and the face of the inner wall *m* of the recesses *k*, in which space are placed small rollers or balls as *n*, that will engage the wall *m*.

To the clutch J' is secured the actuating lever K. When the outer end of the lever K is raised, the rollers or balls will drop back from the wall *m* of the recess *k*, and rest on the pins *l'*. The reverse movement of the lever will bring the rollers or balls into engagement with the wall of the recess; thereby forming a clutch by which the wheel H is rotated, to raise the rack I and the arm B, and the parts connected thereto.

L represents the cap or cover for the rack wheel and is secured to the bar E, the reverse side of which cover is shown in Fig. 10, a portion of the side thereof being cut away to admit the lever K. The pins *l'* hereinbefore referred to, are secured to the cap L, and pass into the recess *k* below the balls to hold them out of engagement with the wall *m*, when the wheel H is moved by the rack to lower the chair body.

To lower the chair body, a worm wheel M and clutch N secured together are placed on the hub E' of the rack wheel H, and the clutch portion in the recess *j*, of the clutch wheel H. The clutch N is formed of radial or arm portions *o*, that are so shaped as to form wedge or V shaped pockets or spaces between the arms and the inner face *p*, of the wall of the recess *j* in the wheel H, in which are placed rollers or balls *n*, similar to those used and described in the lifting clutch, to form a clutching means between the arms *o* and the wall of the wheel H. It will be noticed that the clutches J' and N engage wheel H in a similar manner, the one J' to rotate the wheel H, and the other to hold it against a reverse movement that would be independent of the worm wheel M.

To secure the chair body in a vertical adjustment and to lower the same, a worm as P is provided and journaled in the base A by the journal box 1, secured to the side of the base, and a perforation 2, in the top of the base proper as shown in Fig. 5, and having engagement with the worm wheel M, as shown.

On the worm shaft P' is mounted a wheel Q, by which the worm may be turned to lower the chair body. The pitch of the screw or worm is such that with the weight of the chair body, a slight impulse given to the wheel Q will rotate the worm and worm wheel M, which

rotation will be continued by the exertion of the weight of the chair body on the rack and wheel H, until the rotation of the wheel Q has been arrested by the operator, or the chair body has reached the lowest point of vertical adjustment. The movement of the worm and wheel will cause a reverse movement of the wheel H, the clutch J' having been released by the lever K by the action of the springs *s*, and the balls *n* resting on the pins *l'*, will allow the wheel H to rotate reversely to the movement given to it by the actuating lever, to lower the rack I, and the parts supported thereon.

In operation, to raise the chair body, the foot lever K is pressed downwardly to rotate the clutch J', and thereby turn the rack wheel H, a distance to raise the rack I. The clutch N formed by the arms *o*, and the ball *n*, will at the instant the foot lever is released, engage and hold the wheel against a reverse movement; the spring *s* serving to raise the lever K, to its normal position, when the operation may be repeated to raise the arms B. In raising the arm C and the chair body, the bar D is brought into action or service. The movement of the inner end of the bar being limited by the link *a*, will cause the bar to rock over its pivotal connection *t*, with the arm B, raising the outer or front end of the bar, and thereby the arm C and the chair body.

To lower the chair body, a slight rotary impulse is given to the wheel Q, by the hand or foot of the operator, which rotary movement will be continued by the pressure or weight of the chair body, exerted on the rack I, wheel H, and the spiral teeth of the wheel M on the worm P, until the parts have reached the lowest point of vertical adjustment as hereinbefore stated.

To rock or tip the chair body over the base and about its pivotal connection with the support C, the levers *h* are depressed to remove the tooth of the pawl *e* from the rack *d*.

At the bottom or under side of the seat frame R, and secured thereto, is provided a ring or circular portion S, adapted to rest and turn upon the circular support F, through the medium of a pivot bolt S² whereby the chair body may be turned transverse the arm C, and tipped or rocked laterally.

The foot rest T, is formed substantially as shown, having a foot bar U, and a bracket or support V, the latter having a circular base *x*, adapted to be rotated about a central pin *y*, and be locked in desired position by the spring pawl *z*, the pin *z'* passing through the plate *z*² into apertures in the plate *z*³, thus providing a foot rest that may be turned in toward the leg rest for the accommodation of children.

Referring to Figs. 2, 12, and 13, A' represents the head rest, the supporting stem of which is divided into two parts *x'* and *x*², which are semicircular in cross section, having at their upper end arms as *x*³, projecting

therefrom, at right angle or thereabout, at the outer end of and between which is provided a conical recess x^4 , in which is placed a conical pin x^3 . A link to connect the cushion frame x^6 , to the support, is formed of two parts x^4 and x^5 , substantially as shown, pivotally connected as shown at x^7 , and having at and between their outer end portions a circular socket x^8 , to receive the ball x^9 , of the cushion frame, and at their other ends a conical recess x^{10} , similar to recess x^4 , in the arms x^3 , in which is placed a conical apertured pin x^5 . A bolt x^{11} , is passed through the pin x^5 , on the threaded end portion of which is provided a handle nut as shown. The split stem portions are placed in the sleeve x^{12} , secured to the back of the chair as shown in Fig. 2, in which it may be fixed in desired adjustment by turning the handle nut to draw the arms x^3 , and the inner ends of the link onto the conical portions of the pin x^5 , thereby spreading the inner ends of the link apart, and at the same time closing the outer ends and socket x^8 , on the ball x^9 . The same movement will spread the outer ends of the arms x^3 apart, thereby spreading or opening one side of the stem portions x^4 , x^5 , so as to bind them against the sides of the sleeve x^{12} , by which the support will be held in vertical adjustment in the sleeve, and cushion, in desired adjustment in the link.

Having thus fully described the nature and object of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a chair structure, of a base and a body portion, an intermediate body support consisting of two superposed arms hinged together, one arm being hinged to the base and the other connected with the body portion, a beam or lever pivoted to the lower arm, the lower end of said lever or beam being connected to the base to move in an arc of a circle, a connection between the upper end of said lever or beam and the upper arm to transmit the movement of the lower to the upper arm, means for raising and lowering the said arms and means for sustaining the body portion in adjusted position, substantially as herein described.

2. The combination in a chair structure, of a base and a body portion, two superposed arms or levers hinged together at their forward ends, the free end of the lower arm hinged to the base and the free end of the upper arm connected to the body portion, a swinging bar pivoted intermediate of its ends to the lower arm, a connection between the upper end of said swinging bar and an intermediate portion of the upper arm, a link pivoted to the lower end of said swinging bar and to the base, means for raising the lower arm, and means for sustaining the chair body in its adjusted position, substantially as herein described.

3. The combination in a chair structure, of a base and a body portion, two superposed arms or levers as B and C, hinged together at

their forward ends, the free end of the arm B hinged to the base, and the free end of the arm C pivoted or hinged to the chair body, a swinging bar D pivoted to and interjacent with the ends of the lever B, a link b connecting the forward end of the bar to the arm C, and a link a connecting the rear end of the said bar to the base, an actuating lever K, the rack wheel H and a clutch J' to engage the rack wheel H, a rack I connecting said wheel with the lever B, whereby said lever may be raised and its movement transmitted to the lever C to raise the body of the chair, and means for sustaining it in its elevated position, substantially as herein described.

4. The combination with the base and body of a chair, and the intermediate supporting frame, means for raising and lowering the said frame and body, said means comprising a rack and rack wheel, the rack being connected to a member of the supporting frame and held in engagement with the rack wheel, which is journaled in said base, said rack wheel having recesses in its sides, clutch plates journaled in said recesses, the projecting portions of said clutch plates in conjunction with the walls of recesses forming V-shaped pockets balls or rollers placed in said pockets, transversely arranged pins located beneath the balls in one recess, an actuating lever K keyed to one of said clutch plates, a worm wheel, connected to the other clutch plate, a worm to engage the wheel, and a fly wheel carried by the worm, substantially as herein described.

5. The combination with the base and body of a chair and an intermediate supporting mechanism, of means for raising and lowering the body, said means consisting of a rack and rack wheel, the rack being connected to a member of the intermediate supporting means and held in contact with the rack wheel which is journaled in the base and is provided with recesses in its sides, clutch plates journaled in said recesses, and having projections which in conjunction with the walls of the recesses form V-shaped pockets, balls or rollers located in said pockets to engage the walls of said recesses, a spring actuated lever for operating one of the clutch plates, a cap to cover that clutch plate and its recess and provided with pins projecting inward and located beneath the balls in the cap covered recess and occupying the spaces between the projections of the clutch plate and the wall of the recess, a worm wheel carried by the other clutch plate, a worm located in the chair base to engage said worm wheel, and a fly wheel supported by said worm, substantially as herein described.

6. The combination with the base and body of a chair, and the intermediate supporting frame, means for raising and lowering said frame and body, said means comprising a rack and rack wheel; the rack being connected to a member of the supporting frame and held in engagement with the rack wheel, which is journaled in the base, said rack wheel having

recesses in its sides, clutch plates journaled in said recesses, a clutch mechanism to engage one of said clutch plates and means to disconnect the clutch mechanism, an actuating lever secured to one of said clutch plates, and a worm wheel connected with the other clutch plate, a worm to engage the wheel, and a fly wheel carried by the worm, substantially as described and herein set forth.

10 7. A head rest for chairs, consisting of a divided rod, a sleeve or bearing in which the rod is supported, parallel laterally extending arms carried by the upper ends of the two parts, a head rest cushion, links hinged intermediate of their ends, the outer ends embracing the head rest stem, means for securing the links to the outer ends of the laterally extended arms, and means adapted to expand the laterally extending arms and the links, whereby the head rest stem, the links, the arms and the two part rod are simultaneously locked in adjustment, substantially as herein described.

8. In combination, a supporting sleeve, a two-part rod supported thereby, arms projecting laterally from said rod and provided with conical apertures, links hinged together and provided with opposing conical apertures and with opposing semi-circular ball sockets at their outer ends, a head-rest stem provided with a ball to be clamped in said sockets, a double cone located in the conical sockets of the laterally projecting arms and links, a bolt passing through said cone, and a handle nut on the end of said bolt, substantially as herein described.

In testimony whereof I have hereunto set my hand this 13th day of November, A. D. 1893.

AARON P. GOULD.

Witnesses:

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BURT A. MILLER.