

April 29, 1941.

J. B. NEWHARDT

2,239,732

ADJUSTABLE CHAIR

Filed Feb. 24, 1937

6 Sheets-Sheet 1

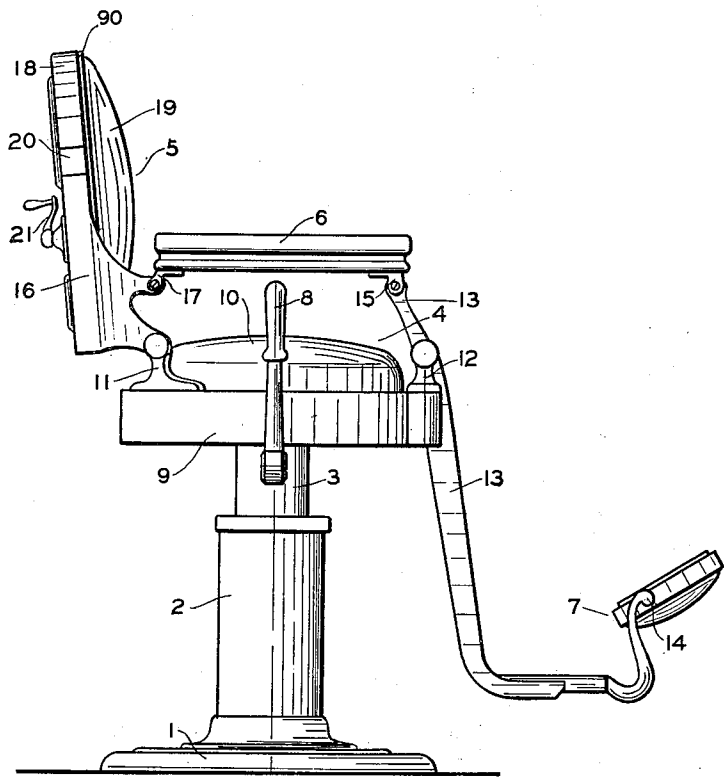


FIG. 1

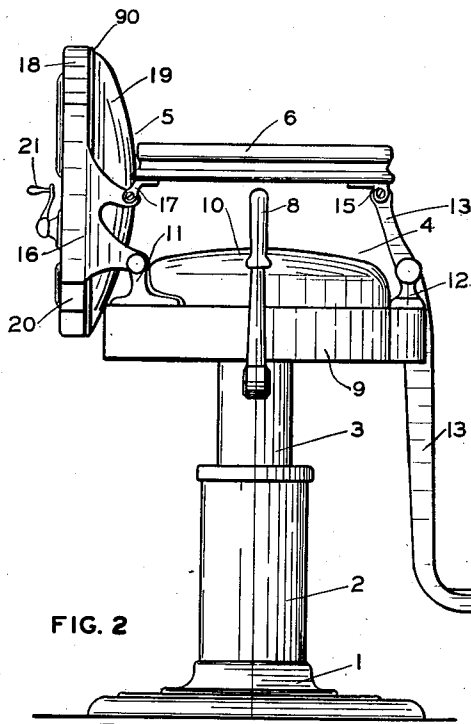


FIG. 2

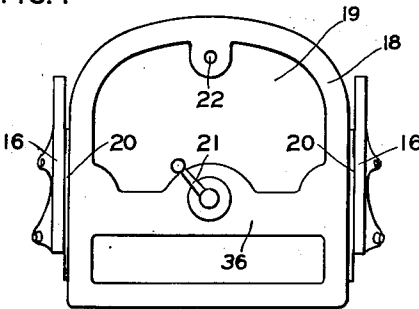


FIG. 3

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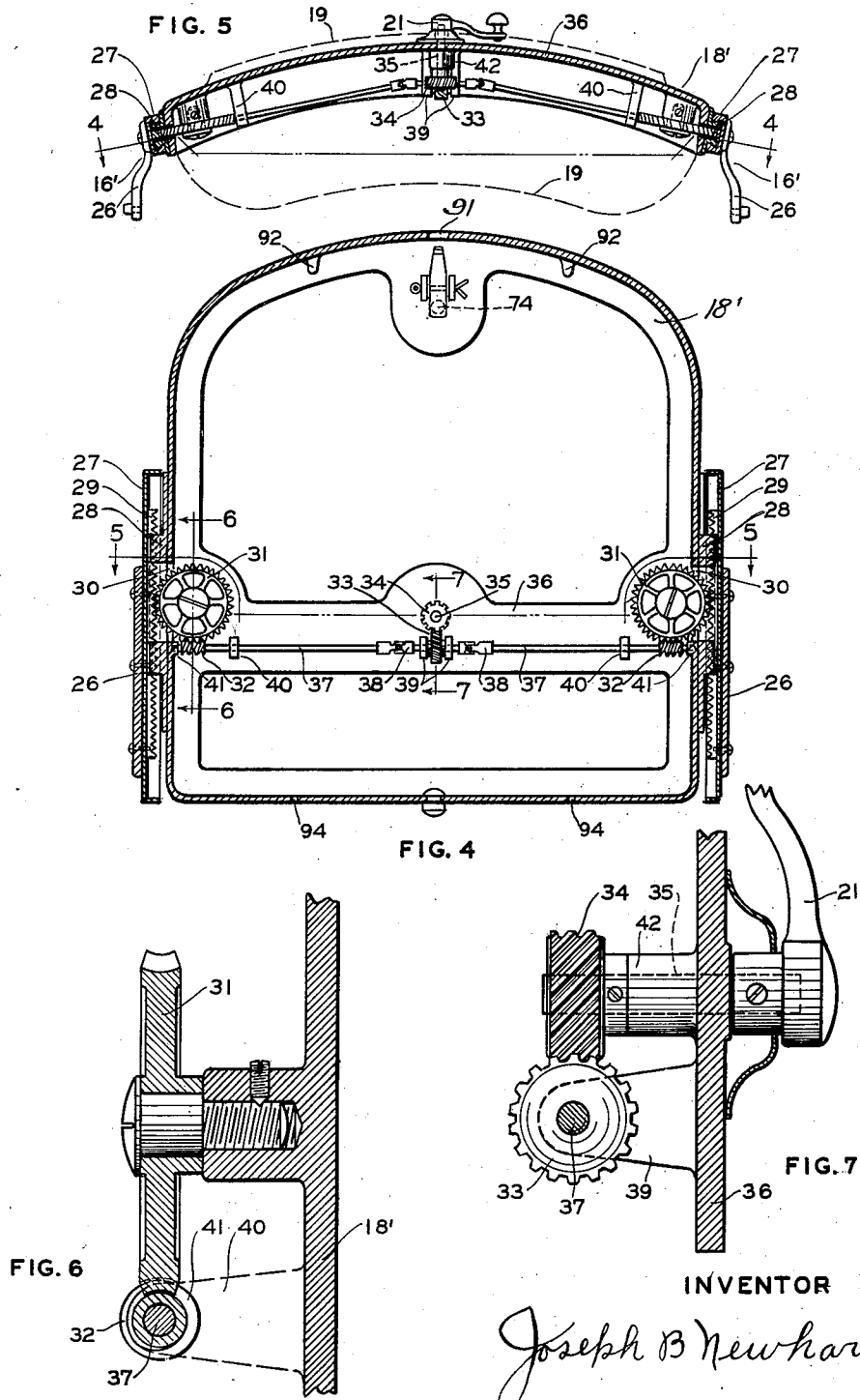
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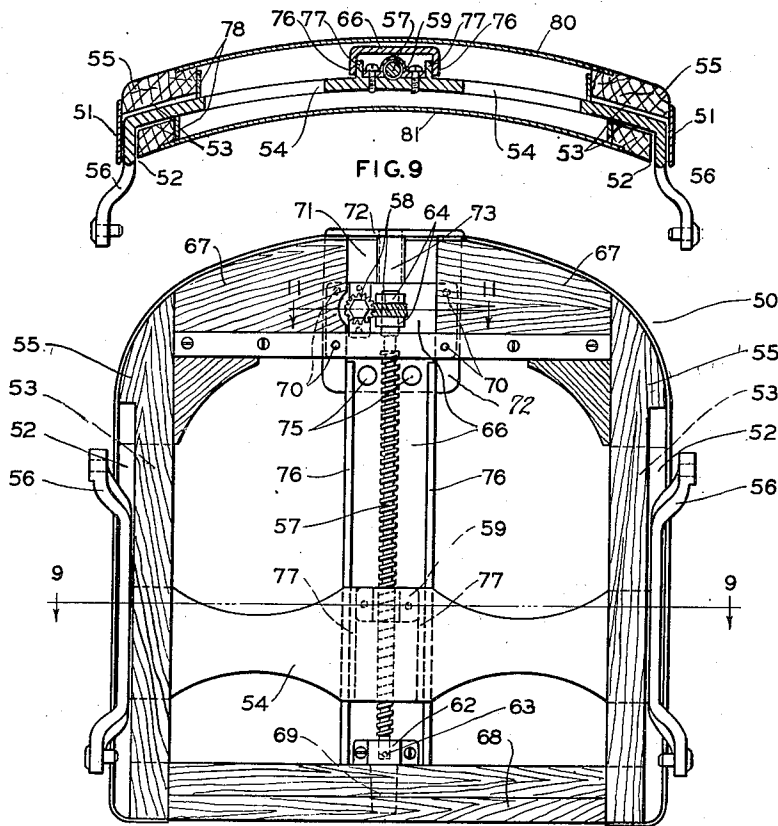
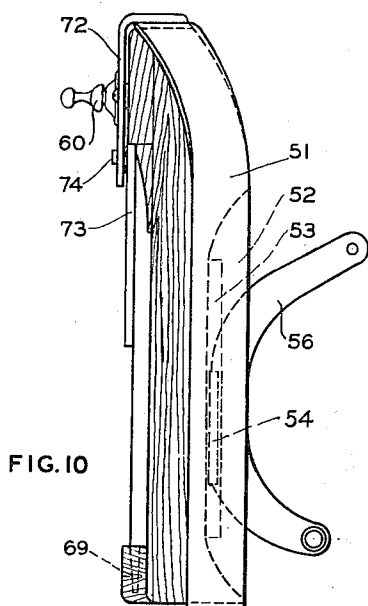


FIG. 8

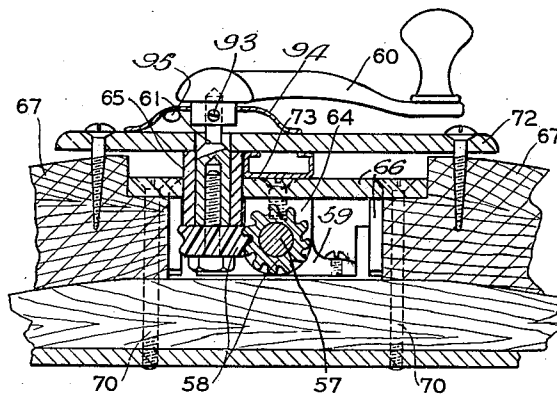


FIG. 11

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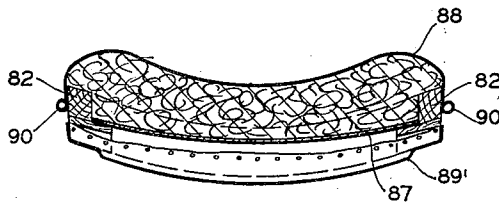


FIG. 13

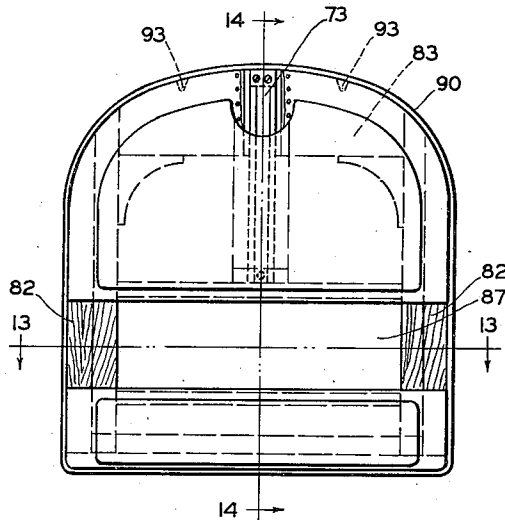


FIG. 12

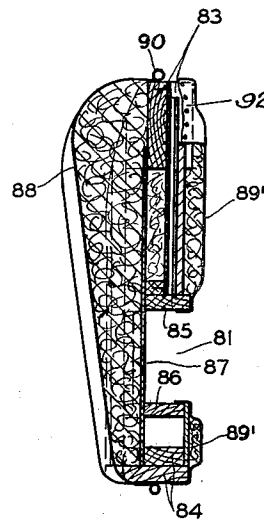


FIG. 14

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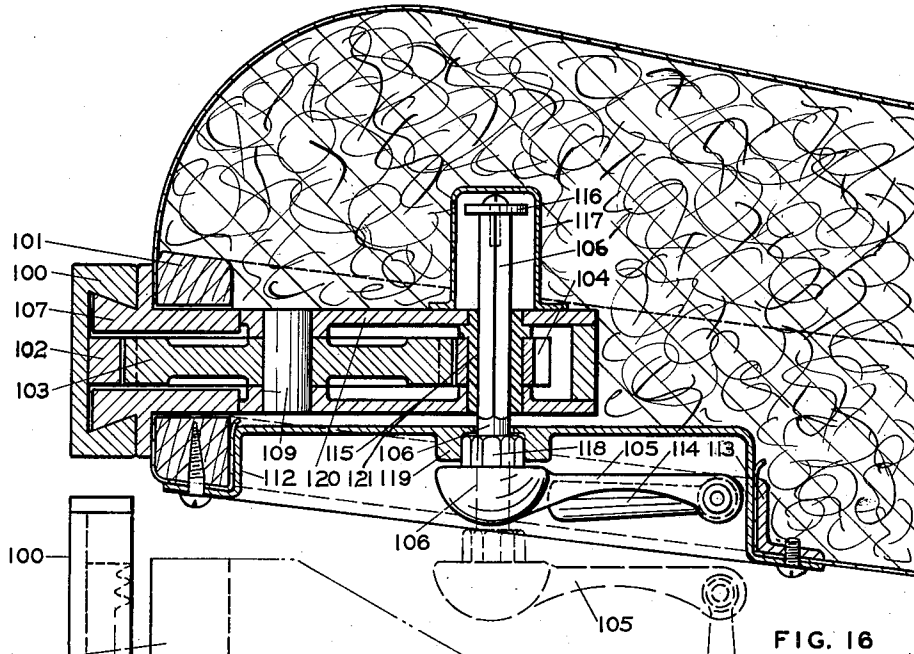


FIG. 16

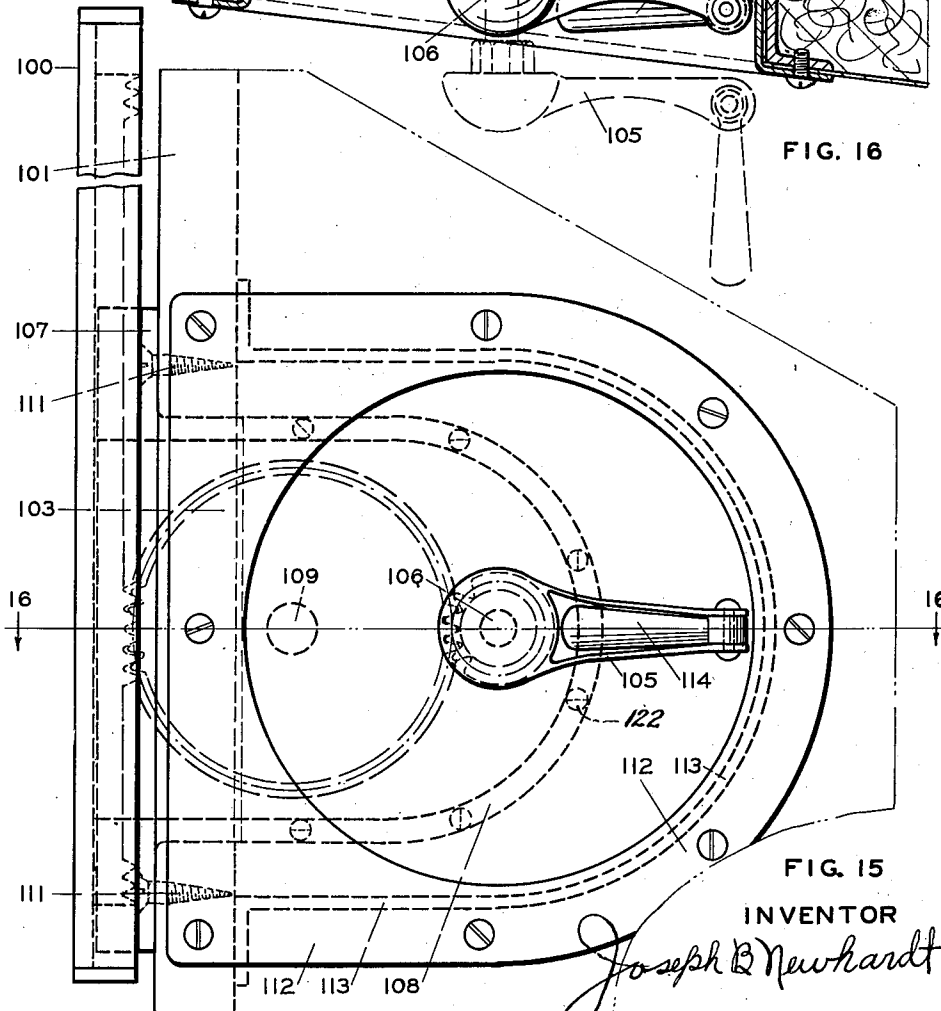


FIG. 15

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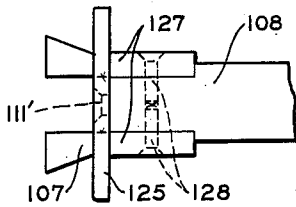


FIG. 20

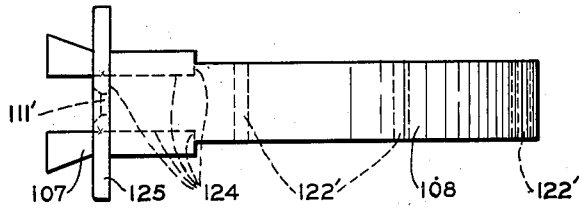


FIG. 18

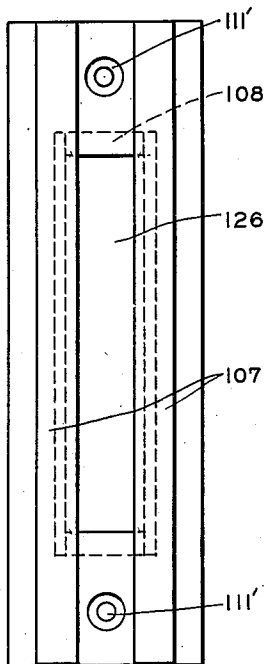


FIG. 19

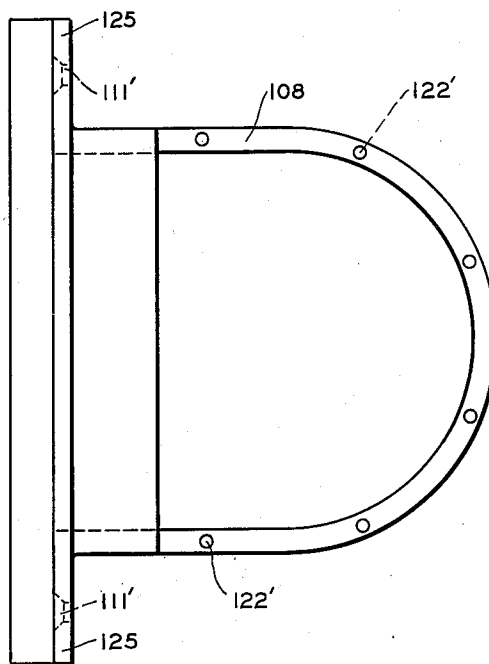


FIG. 17

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UNITED STATES PATENT OFFICE

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ADJUSTABLE CHAIR

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Application February 24, 1937, Serial No. 127,497

7 Claims. (Cl. 155—158)

This is a continuation-in-part of my co-pending application Serial Number 601,907, filed March 30, 1932 and titled "Barber chairs."

The invention is primarily directed to an improved type of chair-back incorporating means for raising and lowering the same in relation to the seat of the chair upon which it is mounted. While the features of the invention are applicable to chairs and the like, in general, they will be found particularly advantageous as herein adapted to adjustable chairs of the type employed in barber and beauty shops as well as in the dental and various other branches of the medical profession.

There are several professions and trades in which chairs equipped with a back which may be raised and lowered in relation to the seat are highly desirable if not imperative. Numerous forms of this type of chair have been in use for some time but no single form or type of back has been sufficiently satisfactory, in all respects, to merit wide adoption and use. The improved form of adjustable back provided by this invention possesses advantageous and novel features which, I believe, should render it universally satisfactory for professional uses in all important respects, including safe operation, appearance, strength and durability, simplicity and ease of operation, trouble-free service and cost.

One of the greatest potential demands for adjustable chairs having this type of back exists in the millions of barber shops and beauty parlors in this country. For this reason I wish to particularly stress the ready adaptability of the invention to chairs of the conventional form now in use and now being manufactured for this class of service.

In barber shops not equipped with special small-size chairs for children, it is still common and almost universal practice to place a board across the arms of the conventional barber chair to serve as a seat for children. This is not done primarily for the purpose of seating the child at a higher elevation from the floor, since such chairs are commonly equipped with an hydraulic lift or the like for elevating the entire back, seat, footrest and armrest assembly. It is done primarily to bring the child's head well above the top of the back, particularly for the purpose of gaining easy access to the back of the head and neck. The use of such an improvised seat is highly unsatisfactory. Small children are often frightened by being placed in such an apparently precarious position, without armrests or other satisfactory means of "holding on" and the im-

proved seat is more than likely to slip about on the arms of the chair, to the inconvenience of the barber and discomfort of the child. Furthermore a child so perched above the arms of the chair must ordinarily rest his feet upon the seat cushion. This is obviously a nuisance in either dry and dusty or wet weather.

The adjustable back herein provided entirely obviates the use of an improvised seat such as above mentioned, or of any other type, since a child can be seated in the chair in the same manner as a larger person and, by lowering the back sufficiently from its normal position, the back of the child's head and neck will be readily accessible for the unobstructed use of clippers and shears, leaving the child safely and comfortably seated.

An adjustable back of the type herein provided will also be useful to barbers in accommodating adults of either unusually tall or short stature. Also, in shops equipped with drainboards adapted to fit onto the back of the chair and washbowls so located behind the chair that a customer is not required to leave the chair to have his hair washed, such backs will be of great assistance in adjusting the back and drainboard assembly to a convenient and comfortable position.

The above is intended only to illustrate some of the numerous advantageous uses to which the invention may be put and it is not intended to limit the invention with respect to the uses to which the novel features of the apparatus and mechanisms herein provided may be readily adapted.

The accompanying diagrammatic drawings illustrate a chair of the class above mentioned which incorporates an adjustable back of the type provided by the invention. The drawings also illustrate certain specific forms of this type of adjustable back and some of the many other forms, not illustrated, will be mentioned and briefly described in connection with the following description of the drawings.

Figures 1 and 2 of the drawings represent side elevations of a barber chair equipped with an adjustable back such as provided by the invention, this chair being otherwise of conventional form. Figure 1 shows the chair and back in normal adjustment for an adult and Figure 2 shows the same chair with the back lowered in relation to the seat and with the back, seat, footrest and armrest assembly elevated to accommodate a child.

Figure 3 is a rear view of the adjustable back shown in Figures 1 and 2.

Figure 4 is a front view, partially in section, of one specific form of back-frame and adjusting mechanism for the type of back provided by the invention.

Figure 5 is a sectional plan view of the same back-frame and adjusting mechanism shown in Figure 4 and the irregular section line along which this view is taken is indicated at 5-5 in Figure 4.

Figure 6 is an enlarged sectional detail of a portion of the back-frame and mechanism of Figures 4 and 5. This section is taken along a plane indicated by line 6-6 in Figure 4.

Figure 7 is an enlarged detail, partially in section, of another portion of the back-frame and mechanism shown in Figures 4 and 5. This view is taken along a plane indicated by line 7-7 in Figure 4.

Figures 8, 9 and 10 are, respectively, a front view, a horizontal section and a side view of another specific form of back-frame and adjusting mechanism embodied by the invention.

The section shown in Figure 9 is taken along a plane indicated by line 9-9 in Figure 8.

Figure 11 is an enlarged detail, partially in section, of a portion of the mechanism for raising and lowering the back. This view is taken along a plane indicated by line 11-11 in Figure 8.

Figures 12, 13 and 14 are, respectively, a rear view, a horizontal section and a vertical section of an upholstered back-frame designed to fit within an outer metal back-frame, such as shown at 18 in Figures 1, 2 and 3 and at 18' in Figures 4 and 5, and to accommodate the gearing mechanism attached to frame 18'.

Figures 15 and 16 illustrate another specific form of gearing mechanism and slidable joint arrangement for accomplishing the objects of the invention. Figure 15 is a rear view of a fragmentary portion of the back adjacent the slidable joint at one side thereof and Figure 16 is a sectional view of the same mechanism shown in Figure 15 taken along a horizontal plane indicated by line 16-16 in Figure 15.

Figures 17, 18 and 19 are, respectively, a side elevation, a plan view and an end view of elements 107 and 108 which comprise a portion of the gear case and slidable joint assembly illustrated in Figures 15 and 16. As shown in these figures, member 107 is formed integral with member 108. Figure 20 is a plan view of element 107 and a portion of element 108 illustrating one manner in which these elements, when separately formed, may be attached.

Referring now particularly to Figures 1, 2, and 3; a base 1 and stationary pedestal 2 support the assembly comprising seat 4, back 5, armrests 6, footrest 7 and the movable pedestal 3, the lower portion of which latter member is slidably housed within pedestal 2.

Pedestals 2 and 3 contain a suitable lifting mechanism, not illustrated, which may be of any well known form and, in most modern barber chairs, is a hydraulic lift. Lever 8 is a pumping arm, reciprocation of which operates the hydraulic mechanism to lift the aforementioned assembly. Manipulation of lever 8, or other suitable means not shown, also releases a locking mechanism or the like, usually disposed beneath the seat and not here shown, to permit the back to be reclined, the armrests lowered and the footrest raised, in unison, as will be later explained in more detail.

The seat 4 comprises a base or frame 9 and an upholstered cushion 10. Standing brackets 11

and 12 are fixedly attached to the seat-frame. Two brackets such as 12 are provided, one on each side of the chair, and each of these is hingedly attached to an arm 13 which connects the armrest on the same side of the chair with the footrest. The armrests are hinged, as indicated at 15, to the upper end of the corresponding arm 13. The footrest is also hinged at 14 in the usual manner.

Two standing brackets 11, one on each side of the chair, are also provided and each of these is hingedly attached to the lower arm of a back-supporting bracket 16. The upper arm of each of the brackets 16 is hingedly attached, as indicated at 17, to the rear of the corresponding armrest. Brackets 16, as previously indicated, are also attached to and support back 5.

It is thus apparent how, when back 5 is tilted to a reclining position about the point of hinged juncture between brackets 11 and 16 as an axis of rotation, armrests 6 are lowered and footrest 7 raised, in unison.

The adjustable back 5 is, in the case here illustrated, of substantially the same size and general contour as the conventional back for this particular chair. It comprises a back-frame 18 and a removable upholstered cushion 19. Instead of being rigidly attached to brackets 16, as in conventional practice, back 5 is slidably joined to the brackets in vertically movable relation thereto by means of members 20 (see Fig. 3) which are slidably mounted on brackets 16 or with joint members rigidly attached thereto, as will be later described in more detail.

A suitable mechanism which effects upward and downward movement of the entire back between brackets 16 upon rotation of crank 21 is provided, in accordance with the invention, and as a feature of the invention this mechanism is preferably housed substantially entirely within the back. The mechanism is also preferably such as to provide a gear reduction or similar mechanical advantage in raising the back, but, altho this is an advantageous feature, particularly with relatively heavy backs such as those employing a metal frame, it is not to be considered an essential part of the invention.

The simplicity and ease with which the back may be raised, by rotating the crank in one direction, and lowered, by rotating the crank in the opposite direction, will be readily apparent, as will also the safe operation which results from housing the mechanism within the back.

When an adjustable back of the type provided by the invention is attached to a chair in such a manner that it may be reclined in relation to the seat, as in the case here illustrated it, obviously, is not only adjustable upwardly and downwardly but, when reclined, is also adjustable laterally (i. e. may be moved inwardly and outwardly in relation to the seat). Therefore, interpretation of the term "raised and lowered" and the term "upwardly and downwardly," or like terms herein used, should not preclude other longitudinal adjustments to the back which the features of the invention permit.

Referring now particularly to Figures 4, 5, 6 and 7; one specific form of mechanism for lifting and lowering a back such as shown in Figures 1, 2, and 3 is here illustrated. In order to better illustrate this mechanism the removable back-cushion 19 of Figures 1, 2, and 3 has been omitted except in Figure 5 wherein its approximate position in relation to the frame 18' is indicated by broken lines.

In Figures 4 and 5 the back-supporting, slidable joint assembly which corresponds, except in minor detail, to members 16 and 20 of Figures 1, 2, and 3, is here designated as 16' and is constructed in three separate pieces comprising bracket member 26, which includes the upper and lower arms for hingedly attaching the bracket to armrest 6 and standing bracket 11 respectively, member 27, which comprises the stationary member of the slidable joint and is rigidly attached to member 26, and member 28, which comprises the movable member of the slidable joint and is rigidly attached to back-frame 18'. It will however be quite apparent that members 26 and 27 may be constructed in one piece, when desired (as shown, for example, at 16 in Figs. 1, 2, and 3) and that, when desired, member 28 may be an integral part of back frame 18' when the latter, as in the case here illustrated, is a metal frame.

Larger views of a similar slidable joint assembly are shown more clearly in Figures 15 and 16 and will be later described.

A toothed rack 29 is provided on each of the members 27 and may be integral therewith but, preferably, to simplify manufacture, is a separate piece rigidly attached to member 27.

A slot 30 is provided in each of the members 28 and in the adjacent side portion of the back-frame to allow each of the gears 31 to engage its corresponding rack 29. Gears 31 are rotatably attached to the back-frame and one specific means of so attaching the gears is illustrated in enlarged sectional detail in Figure 6.

Each of the gears 31 is engaged by a worm or other suitable member 32 for effecting its rotation, the two gears 31 being rotated in opposite directions. Shafts 37 connect both of the worms 32 in rotatable engagement with a set of meshed gears 33 and 34.

Gear 34 is mounted on and attached to shaft 35 which is journaled in a suitable bearing 42, formed integral with or attached to web 36 of the back-frame. The opposite end of shaft 35, which passes thru the web, is attached to a suitable crank or the like 21. Rotation of this crank in one direction causes rotation of the members of the co-operative gear assemblage and causes gears 31 to climb racks 29, thereby lifting the back in relation to the supporting means therefor. Similarly, rotation of the crank in the opposite direction lowers the back.

Since a curved back-frame is employed, in this particular case, universal joints 38 or the like are preferably provided on shafts 37 to allow mounting of the gearing at the central portion of the back relatively close to web 36, so that the back-cushion may be amply padded. The shafts 37 are journaled in suitable bearing brackets 39 and 40 which may be integral with or attached to web 36. The thrust of the shafts is taken at one end of each by the face of gear 33 bearing against member 39 and a suitable thrust bearing is provided at the opposite end of each shaft as indicated at 41. Members 41 may be integral with or attached to back-frame 18.

Preferably the gear arrangements at opposite sides of the back are right-hand and left-hand in order that the relative rotation of gears 31 will be in opposite directions. However this opposite rotation of the gears may be accomplished, when desired, by mounting one of the worms 32 above its corresponding gear and mounting the other worm below the other gear 31, shafts 37

preferably being disposed on a diagonal between the worms.

Another form of adjustable back embodying various advantageous features of the invention is illustrated in Figures 8 to 11 inclusive. This back, instead of employing a metal frame and removable cushion, comprises a wooden frame 50 to which the cushion upholstery, not shown, may be nailed or otherwise attached in any conventional manner. Preferably a bright metal band, or a plated or painted metal band, such as indicated at 51, is applied around the edge of the wooden frame, over the edges of the upholstery. This band also serves to cover the grooves 52 and slots 53 provided in opposite sides of the back-frame.

In Figures 8, 9 and 10 the side-supporting brackets 56 are rigidly connected to each other by a web member 54 which extends across the interior of the back and passes through the slots 53 provided in the opposite side members 55 of the frame. The web 54 and brackets 56 may be integral and may be built into the wood frame while the latter is being assembled or the web and bracket member may be made removable from the frame by constructing it in two or more separable pieces in any of several manners which will be readily apparent to a skilled mechanic.

A rotatable threaded shaft or screw 57 driven by suitable gearing, such as a pair of spiral gears 58, for example, passes through a member 59 which is threaded to engage the screw and is attached to the central portion of web 54, preferably by means of bolts, as shown, or in any other well known manner which will permit removal of member 59 from the web.

Gears 58 are rotated by crank 60 which is attached to one of said gears by means of shaft 61, the other gear being attached to one end of the threaded shaft or screw 57. The opposite end of shaft 57 is journaled in member 62 which also preferably takes the downward thrust of the shaft, a suitable ball-bearing arrangement being provided in the case here illustrated as indicated at 63. The upper end of shaft 57 is journaled in members 64 which are bolted to the upper portion of channel member 66 which, in turn, is attached by means of bolts 70 to members 67 of the back frame. In the case here illustrated, members 64 comprise upper and lower arms positioned above and beneath the gear attached to shaft 57, the upper arm serving as a thrust bearing.

It will be apparent from the foregoing that rotation of shaft 57, by means of gearing 58 and crank 60, will change the position of the threaded member 59 along the length of the screw and, since the screw is attached to the back and member 59 is attached to the relatively stationary back-support members, the back will be thereby raised or lowered (depending upon the direction of rotation of the crank) in relation to the web 54 and brackets 56. With the brackets retained in fixed elevational relation to the seat of a chair, by attaching the back-supporting brackets to the seat-frame, for example, as indicated in Figures 1 and 2, the elevation of the back in relation to the seat may be adjusted to suit requirements.

Preferably shaft 57, gears 58, the bearings 62 and 64, shaft 61 and shaft bearing member 65 are all assembled on a suitable base plate or channel member 66 (see Figs. 8 and 11). The upper end of member 66 is attached to the top

members 67 of the back-frame by suitable removable screws or bolts 70 and the lower end of member 66 is provided with a small protruding portion 69 which fits snugly into a slot or the like provided in the lower member 68 of the back-frame. Crank 60 is attached to shaft 61 by means of set-screw 93 and a dish-shaped cover-plate 94 is provided to hide the opening provided through plate 72 for shaft 61. This cover-plate 94 is provided with an opening 95 through which set-screw 93 may be reached with a screwdriver to accomplish the attachment and detachment of crank 60 to shaft 61. Thus, by first removing crank 60 and cover plates 94 and 72, then removing the bolts which hold member 59 to web 54 and removing screws or bolts 70 which hold the top of member 66 to the back-frame, the entire assembly may be lifted upwardly from the back through opening 71 provided through top member 67 of the back-frame, without disturbing the upholstery.

A cover-plate 72, which fits over the upholstery, (not shown) is provided to cover opening 71 and is removably attached to the upper members 67 of the back-frame. Shaft 61 to which crank 60 is attached passes through cover-plate 72 and preferably this plate also carries the conventional mechanism, indicated at 74 in Figure 10 and shown from another view in Figure 4, for engaging and releasing the blade of a suitable head-rest which fits into channel member 73. Member 73 may also be attached to plate or channel 66. Thus, by removing crank 60 from shaft 61 and removing cover-plate 72, access is gained to screws or bolts 70 for releasing the upper end of member 66 and the bolts which hold member 59 to web 54 are accessible through openings 75 provided in the back of plate or channel 66. These openings 75 will be opposite the bolts when the back is lowered to its extreme position in relation to web 54 and brackets 56.

Preferably, in order to relieve shaft or screw 57 of binding stress and maintain the back in alignment with the brackets 56, so that the back will not tilt sideways from a vertical position between the brackets, suitable guiding means, such as ways 76, are provided along the opposite edges of member 66 and cooperate with ways or the like 77 provided on web 54. It should also be noted that, by rigidly uniting brackets 56 through the medium of web 54, they are prevented from turning in relation to the back and by virtue of the alignment of the back with the brackets 56, by means of the cooperative members 76 and 77, and, by virtue of the narrow slots 53 on opposite sides of the back-frame, through which web 54 passes, the back is prevented from turning appreciably about shaft 57 as an axis. Suitable members 78 may, when desired, be provided along opposite edges of slots 53 to bear against the opposite sides of web 54. The sides of the slots, or members 78, together with web 54, thereby perform a portion of the function of slidable joint members 27 and 28 of Figures 4 and 5, while members 76 and 77, together with the bracket-uniting web 54 and plate 66, perform the other function of joint members 27 and 28.

Thus the back of Figures 8, 9 and 10, like that of Figures 4 and 5, is kept in alignment with the back-supporting brackets by slidable joints disposed on opposite sides of the vertical center line through the back and, in each of the specific mechanisms illustrated, the gearing mechanism which lifts and lowers the back is housed within the back. The joint members are also enclosed,

in keeping with the otherwise neat appearance of the chair and in such a way that there is no danger of injured fingers or torn clothing.

The back of Figures 8, 9 and 10 may be upholstered and padded in the usual way except that a panel of relatively rigid material such as fibre-board, plywood, light gauge metal or the like is attached to the back-frame in any desired manner on each side of web 54 to provide an unobstructed opening across the back through which the web may move upward and downward upon rotation of crank 61. The approximate location of such panels is indicated at 80 and 81 in Figure 9, but these panels have been omitted in Figures 10 and 11 in order to show the gearing mechanism, etc. more clearly.

In Figures 12, 13 and 14, which, as previously mentioned, illustrate a removable upholstered back-frame and cushion corresponding to cushion 19 for the metal back-frame 18 of Figures 1 to 5 inclusive, an opening or slot 81, open at each end and at the back of the cushion and extending transversely across the back is provided to accommodate the gearing mechanism attached to web 36 (see Figures 3, 4 and 5).

The wood frame of this cushion comprises side members 82, top member 83 and bottom member 84, preferably united by gluing and/or by nails or screws. The frame is conventional except for the provision of the slot 81. This provision includes members 85 and 86, which extend between opposite side members 82, and a suitable relatively thin plate or partition 87 of fibre-board, plywood, light-gauge metal or the like which preferably extends between the top and bottom members 83 and 84 respectively as well as the opposite side members 82, although it may, when desired, extend vertically only from member 84 or member 86 to member 85.

The front of the wood frame is padded, as indicated at 88, in any well known manner, and the padding is covered with leather, upholstery fabric or the like, indicated at 89', which may be tacked or otherwise attached to the frame. Preferably a bead 90 is provided peripherally about the cushion frame to cover the small space between the cushion frame and the metal frame into which it fits. The position of this bead with reference to frame 18 is indicated at 90 in Figures 1 and 2.

The back side of the cushion is also padded in the case here illustrated, since this is conventional practice in the best chairs of the type shown in Figures 1 and 2, but this padding may be omitted when desired. Leather, upholstery fabric or the like preferably covers the back of the cushion however, except for slot 81 and groove 92, and is indicated at 89'.

The top member 83 of the cushion frame is grooved at the back as indicated at 92 in Figure 14, to accommodate the conventional mechanism, indicated at 74 in Figure 4, for engaging the blade of a conventional head rest. This blade is passed through a slot 91 in the back frame immediately above mechanism 74 (see Figure 4) into channel 73, which is attached to the removable cushion frame as indicated in Figures 12 and 14. It is worthy of note that this conventional type of head rest mechanism may be dispensed with, when desired, with the adjustable back of the present invention and the blade of the head rest, which is vertically adjustable, may be replaced by any desired form of clamping mechanism or the like for removably attaching the head rest to the back.

To place the back-cushion of Figures 12, 13 and 14 in frame 18 of Figures 4 and 5, the holes 93 in upper member 83 of the cushion frame are first registered with the lugs 92 of the metal frame and the lower end of the cushion is then shoved into place and held to the bottom rail of frame 18' by screws or similar removable members inserted through holes 94 in this member into member 84 of the cushion frame. With the removable back-cushion in place web 36 of frame 18' covers the back of slot 81 and the ends of the slot are covered by the side members of the metal frame 18'. Thus the neat appearance of the back is maintained and the mechanism housed therein is made fully accessible by simply removing the cushion.

Figures 15 and 16 illustrate another specific form of mechanism disposed adjacent one side of the back for lifting and lowering the same in relation to the stationary member 100 of the slidable joint arrangement here illustrated. Preferably the back in this particular case is relatively light weight, having light wood frame, for example, one side member of which is shown at 101. Rack 102 extends lengthwise of member 100 which latter may be fixed or hingedly attached to the seat frame of a chair in any desired manner, such as, for example, that illustrated in Figures 1 and 2, or it may be suitably attached to any other desired portion of the chair which is retained in fixed elevational relation to the seat.

Gear 103 movably engages rack 102 and is retained in fixed elevational relation to the back. Gear 104, may be rotated by turning crank 105 and the connecting shaft 106, thereby rotating gear 103 which is thereby caused to climb or descend rack 102 and move the back upwardly or downwardly in relation to the supporting means therefor, depending upon the direction of rotation of crank 105.

In this particular case, the slidable movable member 107 of the joint arrangement, which is carefully fitted to slide in member 100, includes a U-shaped strap or the like 108 extending through a slot provided in the side member 101 of the back-frame. Cover plates 120 and 121, having bearings for the shaft 109 and bushing 115 of gears 103 and 104 respectively, may be bolted as shown in Figure 15, or otherwise removably attached to strap 108, thereby providing a closed case for the gears. In assembling the back, this case may be slipped through the slot provided in member 101 and attached to said member by bolts, wood screws or the like, passing through the upper and lower portions of member 107 into member 101 as indicated, for example, at 111. A clearer illustration of that portion of the gear case and slidable joint assembly comprising elements 107 and 108 of Figures 15 and 16 is shown in Figures 17, 18 and 19. As here illustrated, joint element 107 and strap element 108 are cast or otherwise formed as a single piece. They may, however, be separately formed and attached by welding, brazing or the like along the lines indicated at 124 in Figure 18. Bolt holes 122' are provided in element 108 and tapped to receive the bolts 122, shown in Figure 15, for attaching cover-plates 120 and 121 (see Figure 16) thereto. Countersunk holes 111' are provided in the flanged portions 125 of joint member 107 to accommodate screws 111, shown in Figure 15, for attaching the assembly to the back-frame. The slot in element 107 through which gear 103, shown in Figures 15 and 16, pro-

trudes to engage rack 102 is indicated at 126 in Figure 19.

Figure 20 illustrates how strap 108 may be bolted to 107 when these elements are separately formed. As here indicated, the end portions of strap 108 are somewhat narrower than the rest of this member and fit between portions 127 of member 107. These end portions of strap 108 are drilled and tapped to receive bolts 128 which extend through bolt holes provided in portions 127 of member 107, securing the strap thereto.

The back is upholstered and padded in the usual manner as here indicated, except that an opening in the upholstery and padding is left adjacent the gear case at the rear of the back, which opening is preferably covered by a suitable cover plate 112 which is supported, in the case here illustrated, by attachment to member 101 and member 113, which latter in turn may be attached to the wood frame in any desired manner.

In this particular case, cover plate 112 is recessed to accommodate crank 105 which has a foldable handle 114 and provision is made for inserting this crank into the recess when the mechanism is not in use. This is accomplished by providing a relatively long shaft 106, squared as indicated in Figure 16, so that it will engage and turn bushing 115 and may also be slipped inwardly and outwardly through the bushing which is closely fitted to and turns gears 104 upon rotation of the shaft. A suitable stop 116 is also provided on the end of shaft 106 opposite crank 105 and when desired a suitable cover 117 may be provided for this end of the shaft. The crank and shaft are shown in extended position by the broken lines 105 and 106 in Figure 6.

A multi-faced member 118, which may be a part of either crank 105 or shaft 106 or may be firmly attached thereto, engages a multi-faced recess, provided in a lug at point 119 of cover plate 112 or in a suitable member attached thereto. This engagement takes place when the crank is inserted and serves to prevent rotation of the gearing and thereby retain the back at the elevation selected and prevent it from falling when the crank is released. This may be accomplished in any other suitable manner, when desired, and it should be noted that the gear or screw arrangements provided in the mechanisms previously described accomplish the same object.

It will of course be understood that with a mechanism such as shown in Figures 15 and 16 a similar slidable joint arrangement is employed at the opposite side of the back, with the gearing, gear case and rack omitted.

Backs such as ordinarily employed for barber, beauty parlor, dental chairs and the like are, in many cases, too heavy and/or too wide for the satisfactory use of a mechanism, such as shown in Figures 15 and 16, which lifts the back from only one side, since the other side may drag and, to avoid binding, long and exceptionally well fitted joint-members must be employed. Therefore, a mechanism such as either of the other forms illustrated and previously described usually is preferred to that shown in Figures 15 and 16, although the invention is not so limited.

The broad features of the invention definitely contemplates many forms of mechanism other than those illustrated and described in detail for accomplishing its main objective, which, stated generally, is to provide means whereby a chair back or the like may be adjusted to various positions in relation to supporting means therefor

and/or in relation to the seat of the chair. The mechanism so employed need not necessarily embody all of the various features of the invention, although they are cooperatively employed in the preferred forms of mechanism herein shown and described. The mechanism may effect actual movement of the back from either or both sides thereof or from a central point therein or it may simply permit manual movement of the back, although in its preferred form the invention employs a gearing arrangement which gives a mechanical advantage in moving the back in one or more directions.

Many modifications of and departures from the specific forms of mechanisms depicted in the drawings, for accomplishing the same or a similar objective, will be apparent to a skilled mechanic and therefore, any construction which employs one or more of the novel features of the invention, as set forth in the appended claims, will clearly be within the scope of the invention.

Therefore, the invention is not limited except as defined in the appended claims and terms such as "gearing" and other mechanical terms used in the claims should be interpreted broadly and are not intended to limit the invention to the use (as applied to "gearing," for example) of toothed rotary gears.

I claim as my invention:

1. In combination with a chair back, movably mounted on supporting means therefor which include brackets disposed adjacent opposite sides of the back, a member connecting said brackets and extending through slots provided in opposite sides of the back and a mechanism, including gearing and a screw housed within said back, attached thereto and engaging threaded means on said bracket-connecting member for changing the position of the back in relation to said brackets.

2. In combination with a chair back, movably mounted on supporting means therefor which include brackets disposed adjacent opposite sides of the back, a member extending transversely through the back and through slots provided in opposite sides thereof to connect said brackets, a threaded member attached to said transverse member, a screw movably engaging said threaded member, said screw being attached to the back, housed therein and extending lengthwise thereof, and means for rotating said screw whereby to change the elevation of the back in relation to said brackets.

3. In combination with a chair back movably mounted on supporting means therefor comprising brackets disposed adjacent and outside opposite sides of the back and a member projecting through a slot provided in each side of the back to engage said brackets, a mechanism for lifting and lowering the back in relation to the brackets by rotation of a crank provided on the back, a portion of said mechanism being attached to and housed within the back and another portion thereof being attached to said supporting means, the first named portion serving to

operatively connect the crank with the second named portion and comprising a rotatable threaded member meshed with a complementary member to retain the back in the position selected.

4. In combination with a chair back movably mounted on supporting means therefor comprising brackets disposed adjacent opposite sides of the back and a member projecting through a slot provided in each side of the back to rigidly connect said brackets, a mechanism attached to the back and housed substantially entirely therein for lifting and lowering the back in relation to the brackets by rotation of a crank provided on the back, said mechanism comprising a rotatable screw driven by said crank and meshed with a complementary threaded member provided on said supporting means to retain the back in the position selected.

5. In combination with a chair back movably mounted on supporting means therefor which includes brackets disposed adjacent opposite sides of the back and a member extending transversely through slots provided in opposite sides of the back and connecting said brackets, a threaded member releasably attached to said transverse member, a screw movably engaging said threaded member and mounted on a base plate releasably attached to the back, housed therein and extending lengthwise thereof, means for rotating said screw whereby to change the elevation of the back in relation to said brackets, said base plate, screw and threaded member being removable from the back through an opening provided therein, the means which attach the base plate to the back and the means which attach the threaded member to said transverse member being accessible for detachment thereof upon removal of a cover plate provided for said opening.

6. In combination with a chair back slidably mounted on brackets disposed adjacent opposite sides of the back, a mechanism housed substantially entirely within the back and attached thereto for moving the back in relation to the brackets, said mechanism comprising gears extending through slots provided in opposite sides of the back, each of said gears being rotatably attached to the back and movably engaged with a rack provided on the adjacent bracket, and a worm engaging each of said gears and connected with a crank provided on the back to drive said gears in opposite directions and retain the back in the position selected.

7. The apparatus defined in claim 6 wherein said back is provided with a frame to which said mechanism is attached and a cushion separable from the frame, said cushion being provided with an open-faced recess therein for the reception of said mechanism, said mechanism being accessible upon removal of the cushion from the frame and said recess being covered when the cushion is in place by that portion of the back frame to which said mechanism is attached.

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