July 6, 1954 N. E. LAUTERBACH 2,682,916

MEDICAL PRACTICE CHAIR WITH ADJUSTABLE SEAT FRAME

Original Filed July 2, 1946 4 Sheets-Sheet 1

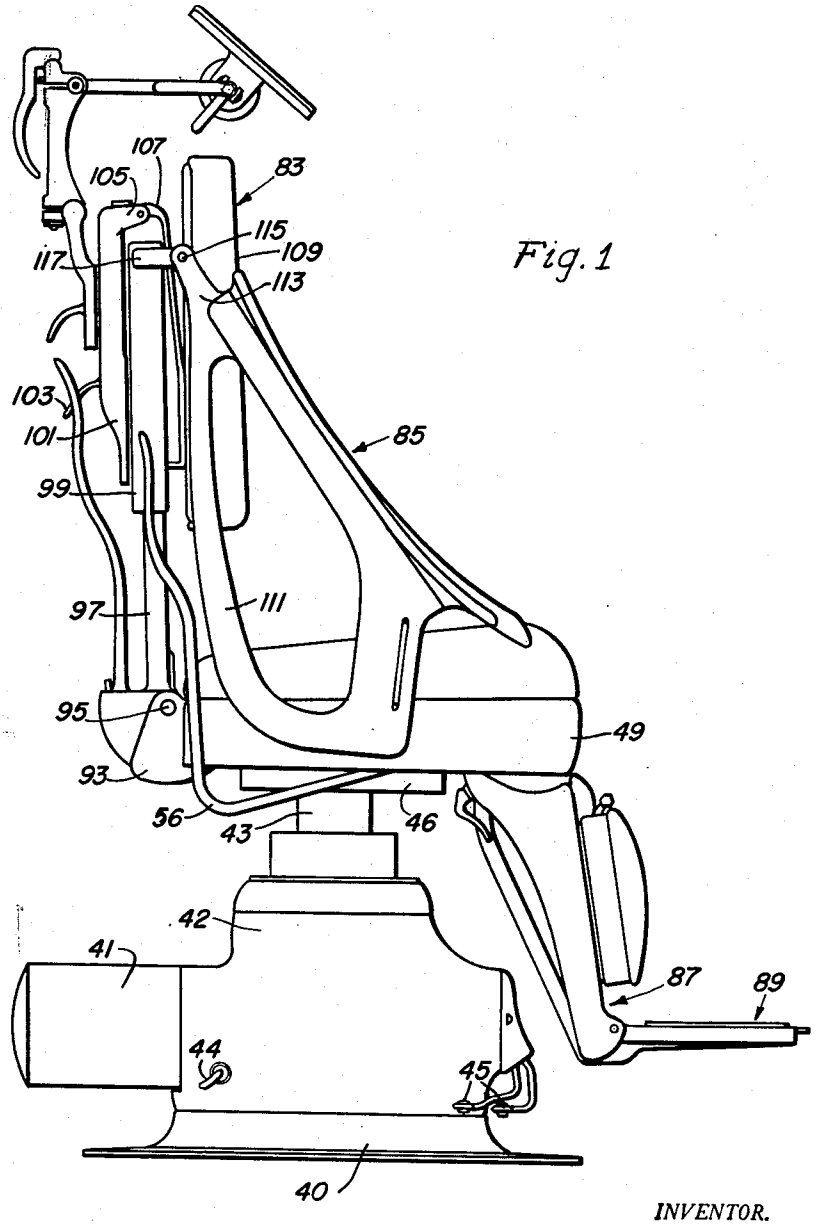

Fig. 1

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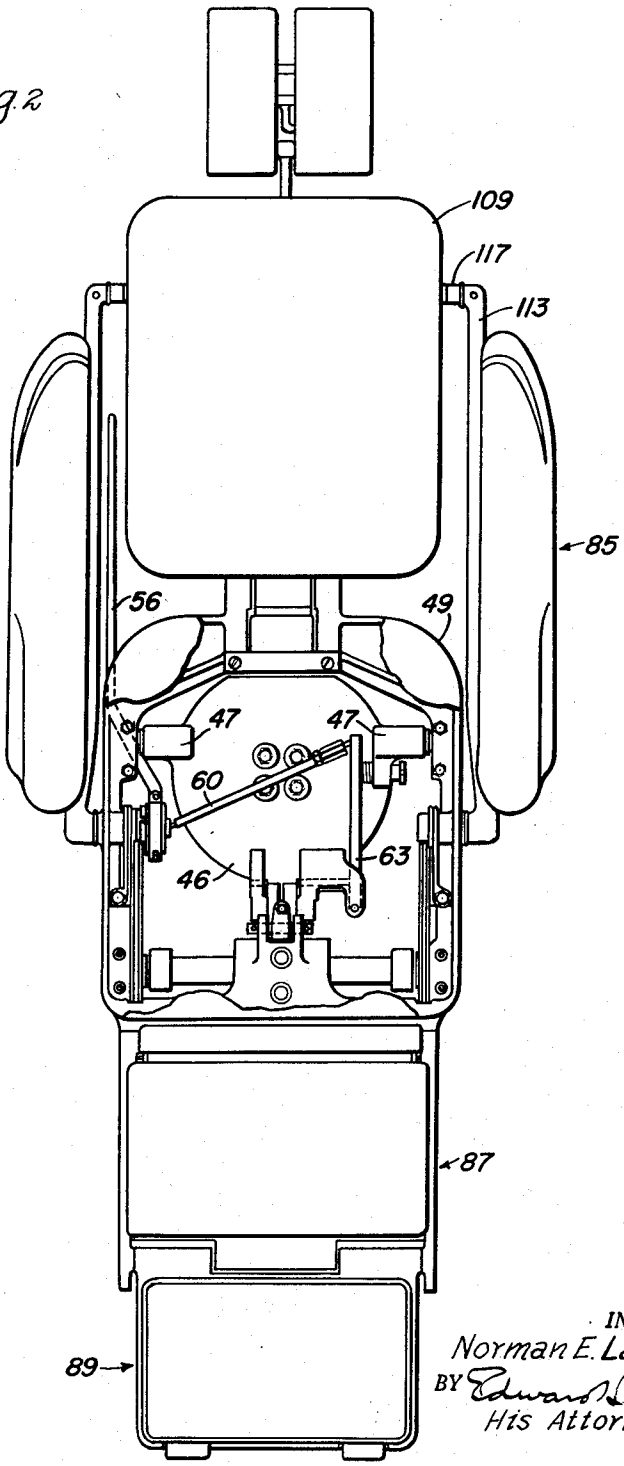
Fig. 2



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MEDICAL PRACTICE CHAIR WITH ADJUSTABLE SEAT FRAME

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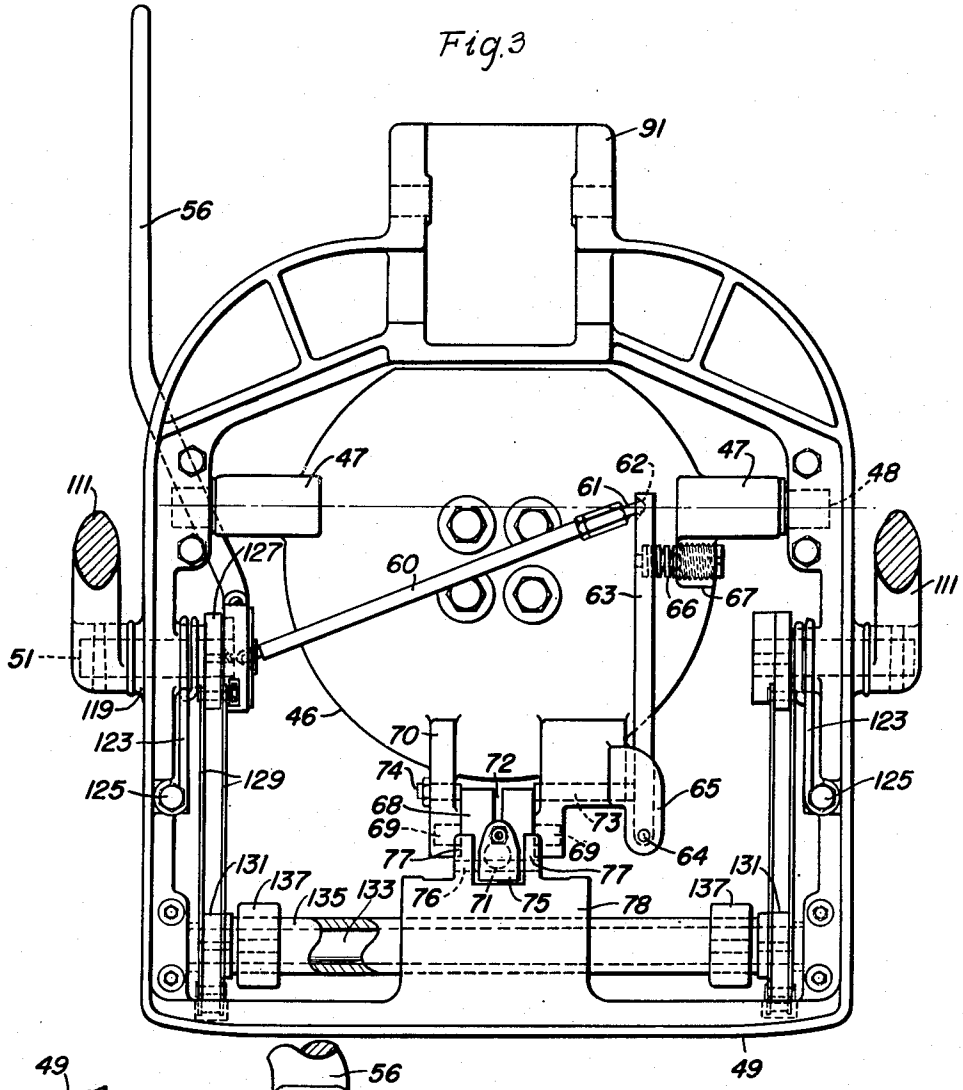
Fig. 3



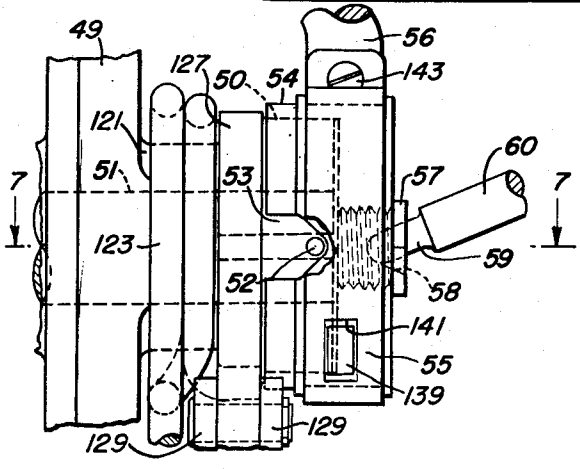


Fig. 4

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MEDICAL PRACTICE CHAIR WITH ADJUSTABLE SEAT FRAME

Original Filed July 2, 1946 4 Sheets-Sheet 4

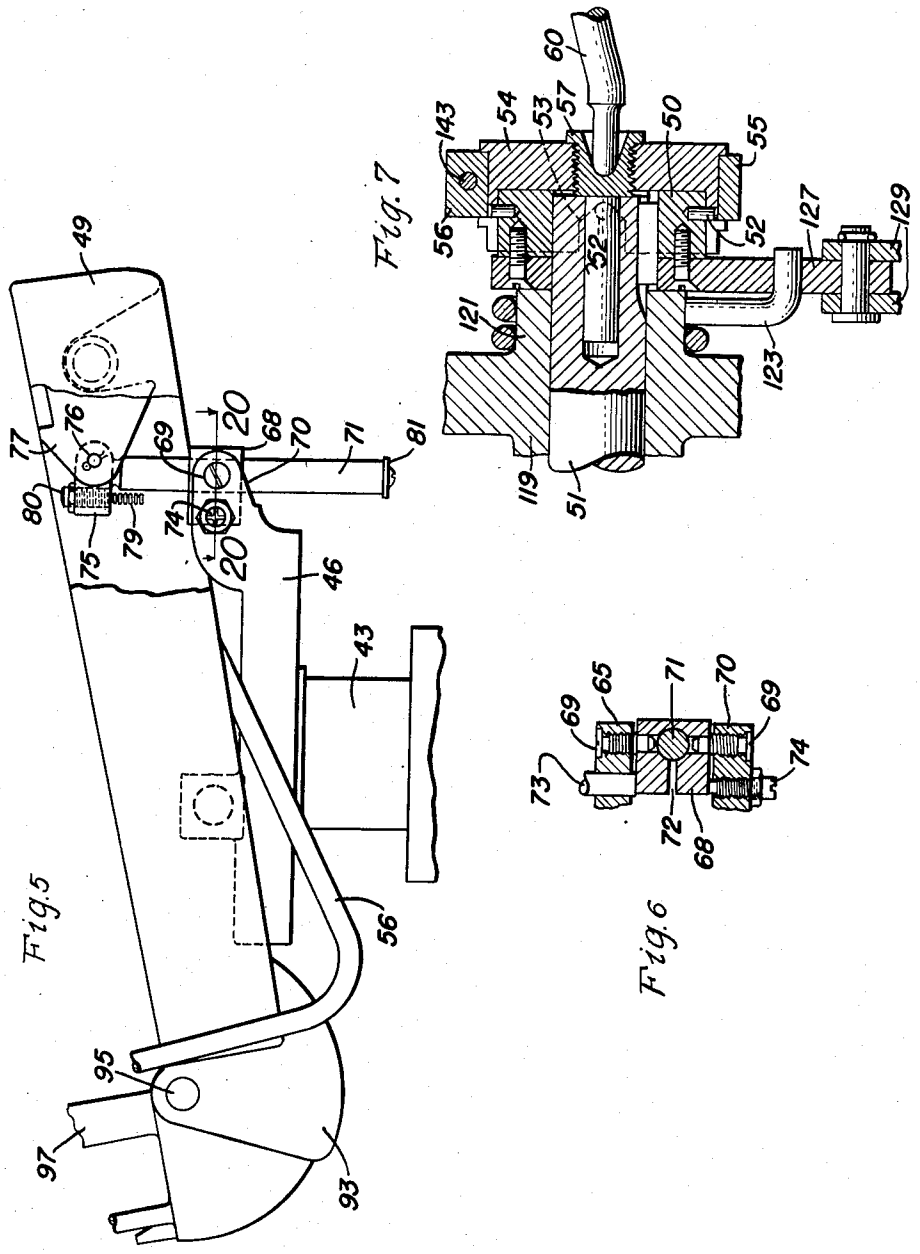

Fig. 5

Fig. 7

Fig. 6

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UNITED STATES PATENT OFFICE

2,682,916

MEDICAL PRACTICE CHAIR WITH ADJUSTABLE SEAT FRAME

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Original application July 2, 1946, Serial No. 680,983. Divided and this application October 1, 1949, Serial No. 119,094

9 Claims. (Cl. 155—116)

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This invention relates to chairs of the variety adapted for use by the medical profession during examinations, treatments and minor operations, one object of the invention being to provide an improved chair of such character having a more adjustable, convenient, and efficient construction.

Another object is to provide a chair of the above character having head, back, arm, and foot rests adjustable to and from positions lying substantially in the plane of the chair seat, for converting the chair into a substantially flat, table-like support.

Another object is to provide such a chair having an adjustable seat frame which may be tilted throughout a range of positions relative to the top of the elevating column.

Another object is to provide an efficient and easily workable means of locking said seat frame in the desired tilted position.

This application is a division of my copending application, Serial No. 680,983, now Patent No. 2,558,143, filed on July 2, 1946, Medical Practice Chair, to which reference may be had for parts disclosed but not claimed herein.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation of a chair embodying the present invention and arranged to support a patient in an upright sitting position;

Fig. 2 is a top plan view of the chair arranged horizontally with portions of the seat broken away to disclose parts of the mechanism;

Fig. 3 is an enlarged top plan view of the seat frame and associated mechanism partly in section and partly broken away;

Fig. 4 is an enlarged fragmentary view of certain details of the mechanism shown in Fig. 3;

Fig. 5 is a fragmentary side elevation of the seat frame, partly broken away to show a locking means;

Fig. 6 is a sectional view on line 20—20 in Fig. 5, and

Fig. 7 is a sectional view substantially along the line 7—7 in Fig. 4.

The preferred embodiment of the invention herein disclosed, by way of illustration, comprises a chair having a circular base 40, Fig. 1, supporting an electric motor 41 and a housing 42 for hydraulic mechanism for raising and lowering a chair supporting column 43 which is mounted for rotation also in the housing, as well understood in the art. At 44 is a foot lever controlling the rotation of the chair and at 45 are foot levers for raising and lowering the chair. These parts for moving the chair column may have any known or suitable construction and form no part of the present invention.

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The chair column carries at its top a generally circular supporting head 46 formed with bearings 47, Figs. 2 and 3, for trunnions 48 by which a seat frame 49 is supported for tilting movement on the chair base. Means are provided, as hereafter described, for releasably locking the seat frame in adjustably tilted positions. The seat frame 49 is a generally rectangular, hollow frame, as shown, on which the back rest, arm rests and leg and foot rests, shown generally at 83, 85, 87 and 89, respectively (Fig. 1), are supported in connected relation for movement simultaneously to different adjusted positions.

The rear of the seat frame is formed with an integral, hollow, box-like portion indicated generally at 91 (Fig. 3), with which the back rest is pivotally connected. This portion 91 comprises spaced, rearwardly extending walls 93 (Fig. 1), the front and lower sides of which are curved substantially in a semi-circle as shown in Figs. 1 and 5. Walls 93 are formed with bearings and a spindle 95 (Fig. 1) pivotally supporting an irregularly shaped member (not shown) forming the base portion of the back rest. Fixed on and extending upwardly from this irregularly shaped member is a post 97 (Fig. 1) slidably received in a bearing in a member 99 having in its rear face an undercut or dovetailed vertical groove (not shown) slidably receiving a similarly shaped tongue on a member 101. Member 101 is provided with a clamp (not shown) operated by a handle 103 for locking the tongue in a vertical position in the grooves in member 99. Member 101 is provided at its upper end with lugs 105 between which is pivotally supported a depending arm 107 secured to the rear side of a substantially rectangular, padded back rest 109 shaped to conform substantially to the patient's back.

As pointed out in my above copending application, Serial No. 680,983, when the back rest is tilted backwardly and lowered to a table-like position, back rest pad 109 is moved towards the seat to maintain a normal distance therebetween. This is an important feature for, otherwise, the pad 109, during such movement, would slide up the patient's back, uncomfortably disarranging his clothes, and leaving a gap between it and the seat.

Each arm rest 85 comprises a frame 111 hav-

ing at its lower forward end a trunnion 51 (Fig. 3) journaled in the side of the seat frame 49, as hereafter described and as described in my said copending application. The upper rear end 113 (Fig. 1) of arm rest frame 111 is pivotally connected at 115 with arms 117 extending forwardly from the part 99 of the back rest which slides on pivoted post 97.

Trunnions 51 are pivotally supported in a bearing in the side of the seat frame 49 comprising an outer boss 119 (Fig. 3) and an inner boss 121 (Fig. 4). Trunnions 51 extend inwardly beyond inner bosses 121 and are connected to one end of a pair of strong coiled springs 123 (Figs. 3 and 4) which are connected at the opposite ends thereof to the seat frame by bolts 125 (Fig. 3). Springs 123 serve to counteract the weight of the patient against the back rest and to assist in lifting the back rest and patient to a sitting position. Trunnions 51 are each also preferably connected to the leg and foot rest supporting mechanism by means of a lever 127 (Fig. 4) keyed thereto which in turn is connected to the leg rest frame mechanism by a pair of bars or links 129 (Figs. 3 and 4). Links 129 are connected at the forward ends thereof to a lever 131 keyed to a shaft 133 (Fig. 3) mounted for rocking movement at its opposite ends in bearings (not shown) in the sides of the seat frame. Mounted to rock independently on shaft 133 is a sleeve 135 (Fig. 3) to the opposite ends of which are fixed a pair of spaced arms 137 (Fig. 3) having upper ends of "gooseneck" shape to avoid interference with the front end of the seat frame. Arms 137 form part of a hinged frame of rigid construction for supporting the leg and foot rests, as described and claimed in my copending application, Serial No. 119,095, Medical Practice Chair with Adjustable Leg and Foot Rest Supports, now Patent No. 2,612,940, granted October 7, 1952.

As explained above, the seat frame is supported for tilting movement on the top 46 of the elevating column 43 and the arm rest structure is utilized in part for controlling means for locking the seat frame in adjustably tilted position on the column. Such means preferably comprises a sleeve 50 keyed on the inner end of the trunnion 51 of one of the arm rests (Fig. 4) inwardly of lever 127, as shown in Fig. 4. Fixed in this sleeve are one or more radially extending pins 52 received in inclined slots or notches 53 in a cap 54 rotatably and slidably mounted on the sleeve so as to be controlled for movement both concentrically and axially of the sleeve. The cap 54 has a strap 55 clamped thereto and forming part of the end of an angular lever 56, Figs. 3 and 4, extending rearwardly and upwardly along the under side of the adjacent arm rest. Lever 56 has a projecting portion or lug 139 (Fig. 4) which projects outwardly through a rectangular opening, as at 141 (Fig. 4), formed in strap 55 for holding one end of said strap in position on said lever while allowing the opposite end thereof to be tightened by a screw 143 (Fig. 4). Set concentrically in the cap is a threaded plug 57 of hardened steel having therein a socket 58 for the reception of a rounded and hardened bearing surface 59 at the left end of a thrust element or rod 60, as seen in Fig. 3. This end of the rod is thus supported concentrically with the trunnion of the arm rest, so as to be undisturbed by its tilting movement on the seat frame, and it will be seen that the swinging of lever 56 in either direction

rotates cap 54 whose inclined slots 53 move the cap axially of the sleeve to press its plug 57 against rod 60 to thrust it longitudinally. Rod 60 thrusts at its opposite end against the resistance of spring-actuated means for operating the locking means controlling the tilting movement of the seat frame on the elevated column of the chair base, as hereafter described. It will also be noted that lever 56 is mounted on cap 54 and is caused to follow the movements of the arm rests, so as to be conveniently and easily located for actuation by the operator of the chair. Sleeve 50 is keyed to trunnion 51 which in turn is keyed to the arm-rest frame 111 so that the arm rest cannot rotate relative to the seat frame without the corresponding rotation of trunnion 51 and sleeve 50. While cap 54, to which lever 56 is fixed, is rotated relative to sleeve 50 for releasing the seat-frame locking mechanism, cap 54 is caused to rotate with trunnions 51 as the arm rests rotate relative to the seat frame. That is, pins 52 on sleeve 50 engage the slots in cap 54, and as the sleeve 50 and trunnions 51 are rotated, cap 54 will either be rotated therewith, or cammed axially along sleeve 50. However, the camming action of cap 54 is opposed by the resistance of spring 66 and of the seat-frame locking mechanism, whereas the only resistance to the rotation of cap 54 with sleeve 50 results from the engagement between rounded bearing surface 59, of thrust rod 60, and socket 58 of plug 57. As the above resistance to rotation is considerably less than the above forces resisting the camming movement of cap 54, cap 54 is readily rotated with sleeve 50, trunnion 51 and arm rest frame 111, as the arm rests are raised and lowered relative to the seat frame.

Thrust rod 60 has at the opposite end thereof a rounded and hardened bearing surface 61 which is seated in a socket 62 in a lever 63 pivoted at 64 on a lug 65 on the head of the elevating column. The rod socket 62 is located concentrically with the axis of the seat frame trunnions 48, so that the rod is unaffected by tiliting movements of the seat frame on the column. At 66 is a coiled compression spring having one end seated in a recess in lever 63 and the other end seated in a recess in an extended portion 67 of the adjacent column bearing 47. One function of this spring is to press lever 63 against rod 60 and normally thrust it against plug 57 in cap 54.

The means for releasably locking the seat frame in its adjustable tilted positions on the base comprises, preferably, a block 68 (Figs. 3, 5, and 6) pivotally supported by trunnions 69 having bearings in lug 65 and a cooperating lug 70 spaced therefrom on the head of the column. This pivoted block 68 is formed with a bearing opening which slidably receives a spindle 71 connected with the chair frame, as hereafter described. Block 68 has a slot 72 extending inwardly to its spindle bearing to provide for compressive clamping of the block around the spindle to lock it thereto. Such locking compression of the block is preferably accomplished by means of a rod 73 sliding longitudinally in a bore in lug 65 with one end bearing against lever 63 and the other against the adjacent side of the block. The opposite side of the block is supported by a short stop rod 74 fixed in lug 70.

Locking spindle 71 is carried by a head 75 formed on or otherwise secured to the top of the spindle and pivoted on a spindle 76 carried in lugs 77 projecting inwardly from an abutment

78 on the seat frame. A coiled compression spring 79, carried by an adjustable screw 80, on the rod head 75, in position to strike block 68, serves to cushion the return of the seat frame to a horizontal position, and a washer 81, on the lower end of the spindle, limits its movement in the opposite direction.

It will be evident from this construction that the pressure of spring 66 against lever 63 normally thrusts rod 73 longitudinally to compress block 68 into locking engagement with the spindle carried by the seat frame so as to lock the latter in adjusted position. Lever 56 may be rotated through a slight angle, however, to cam cap 54 axially of sleeve 50, as previously explained, and thereby thrust rod 60, against lever 63 and thus release block 68 to relieve its locking action on the seat frame spindle 71, thus freeing the seat frame for tilting movement as long as lever 56 is held in such position. During such tilting movement of the seat frame, the thrust rod 60 is turned bodily about its end 61 concentric with the tilting axis of the frame, so as not to affect the operation of the frame locking means, notwithstanding the location of the other end of the thrust rod in eccentric relation to such pivotal axis.

The invention supplies an improved and advantageous arrangement for locking the seat frame in adjustably tilted position on the elevating column. Such movement of the seat frame relative to the elevating column is controlled by a locking lever uniformly positioned along the rear side of one of the arm rests so as to be easily located by the operator with minimum attention and effort.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. A chair comprising a base, a frame mounted for tilting movement on said base and provided with a seat, a back rest pivotally and slidably mounted on said frame, arm rests pivotally connecting said frame and back rest for movement of the arm rests with said back rest, means for locking said frame in different tilted positions, and an operating lever for said locking means connected and movable with one of said arm rests during the pivotal movement of the arm rests relative to said frame.

2. A chair comprising a base, a seat frame mounted on said base for tilting movement about one axis, a back rest pivotally and slidably connected with said frame, arm rests connected with said back rest and pivotally connected with said frame for movement about an axis spaced from said first axis, locking means for securing said frame in adjustably tilted position on said base, actuating means for said locking means having a part concentric with each of said axes, and a lever for operating said actuating means connected and movable with one of said arm rests during the pivotal movement of the arm rests relative to said frame.

3. A chair comprising a base, a seat frame mounted on said base for tilting movement about one axis, a back rest pivotally and slidably connected with said frame, arm rests connected with said back rest and pivotally connected with said frame for movement about an axis spaced from said first axis, means for locking said frame in adjustably tilted position on said base, and means for operating said locking means comprising a thrust element having opposite end portions located substantially on said axes, respectively.

4. A chair comprising a base, a seat frame mounted on said base for tilting movement about an axis, a back rest slidably connected with said frame for pivotal movement about an axis, arm rests movably connected with said back rest and connected with said frame for pivotal movement about an axis, means for locking said frame in adjustably tilted position on said base, actuating means for said locking means having a portion located substantially on the tilting axis of said seat frame, a thrust element having one end connected with said portion and the other end located substantially on the pivotal axis of one of said arm rests, and means comprising a lever connected and movable with said one of said arm rests during the pivotal movement of the arm rests relative to said frame, said lever being movable relative to said arm rest for moving said thrust element and operating said locking means in any adjusted position of said rests and seat frame.

5. A chair comprising a base, a seat frame mounted on said base for pivotal movement about an axis, a back rest pivotally and slidably connected with said frame, an arm rest connected with said back rest and connected with said frame for pivotal movement about an axis, means for locking said frame in adjustably tilted position on said base and having an operating portion located substantially on said frame axis, a thrust rod connected at one end with said portion and having its opposite end located substantially on said arm rest axis, cam means on said arm rest axis for moving said rod longitudinally of said axis, and a lever movable with said arm rest during the pivotal movement of the arm rest relative to said frame, said lever being movable relative to said arm rest for actuating said cam means and operating said frame locking means.

6. A chair comprising a base, a seat frame mounted on said base for tilting movement about an axis, a back rest pivotally and slidably connected with said frame, arm rests movably connected with said back rest and connected with said frame for pivotal movement about an axis, means for locking said frame in adjustably tilted position on said base, actuating means for said locking means having a lever movably mounted on said base, one end of said lever being located substantially on the tilting axis of the seat frame, and a thrust element having one end in engagement with said end of said lever, the other end of said thrust element being located substantially on the pivotal axis of one of said arm rests.

7. A chair comprising a base, a seat frame mounted on said base for tilting movement about an axis, a back rest pivotally and slidably connected with said frame, arm rests movably connected with said back rest and connected with said frame for pivotal movement about an axis, means for locking said frame in adjustably tilted position on said base, actuating means for said locking means having a lever pivoted on said base, a spring for moving said lever in one direction for actuating said locking means, one end of said lever being located substantially on the

tilting axis of the seat frame, and a thrust element having one end in engagement with said end of said lever for moving said lever in the opposite direction to release said locking means, the other end of said thrust element being located substantially on the pivotal axis of one of said arm rests.

8. A chair comprising a base, a seat frame mounted on said base for pivotal movement about an axis, a back rest pivotally and slidably connected with said frame, an arm rest pivotally connected with said back rest and connected with said frame for pivotal movement about an axis, clamping means for locking said frame in adjustably tilted position on said base, actuating means for said clamping means having a part located substantially on the tilting axis of said seat frame, and a thrust element having one end connected with said part and the other end located substantially on the pivotal axis of one of said arm rests.

9. A chair comprising a base, a seat frame mounted on said base for pivotal movement about

an axis, a back rest pivotally and slidably connected with said frame, an arm rest pivotally connected with said back rest and connected with said frame for pivotal movement about an axis, an elongated element pivotally attached to and movable with said seat frame, a clamping means on said base for releasably engaging said element for locking said frame in adjustably tilted position on said base, actuating means for said clamping means having a part located substantially on the tilting axis of said seat frame, and a thrust element having one end in engagement with said part and the other end located substantially on the pivotal axis of one of said arm rests.

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