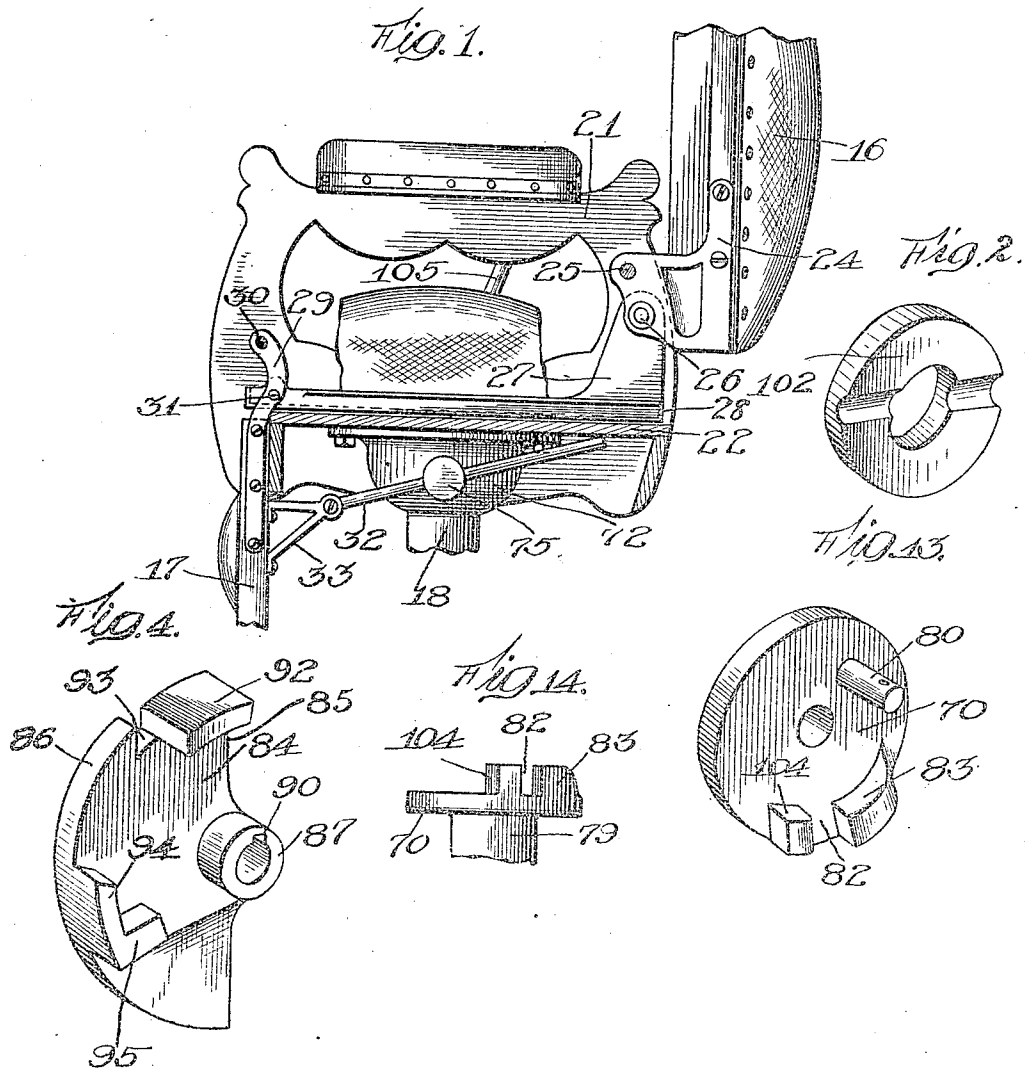


957,258.

H. H. ROSS.
HYDRAULIC BARBER'S CHAIR.
APPLICATION FILED APR. 9, 1906.

Patented May 10, 1910.

4 SHEETS—SHEET 1.



Witnesses:
G. V. Donnan.
Robert H. Wein

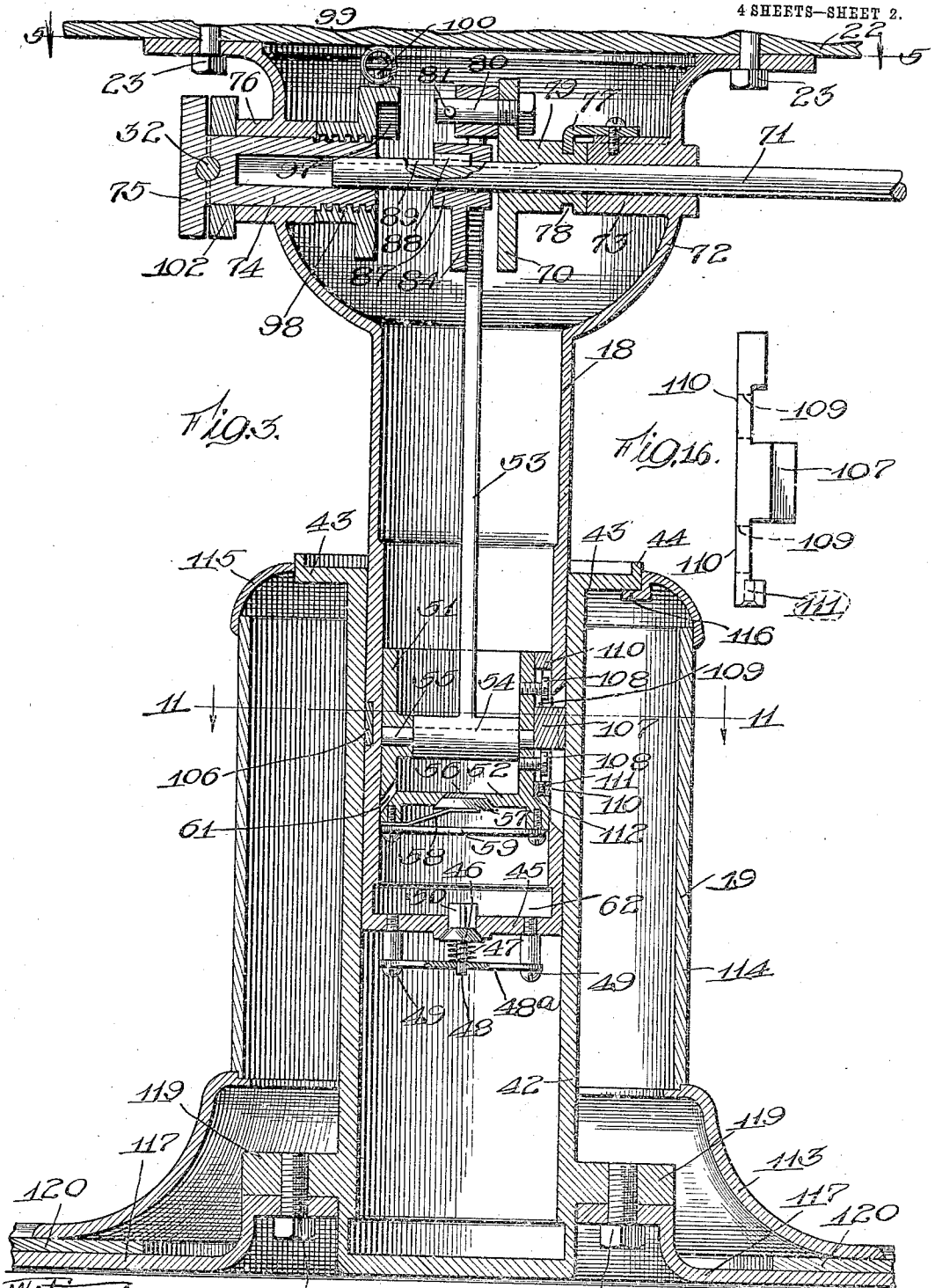
Inventor:
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4 SHEETS—SHEET 2.



Witnesses:
C. U. Domanus
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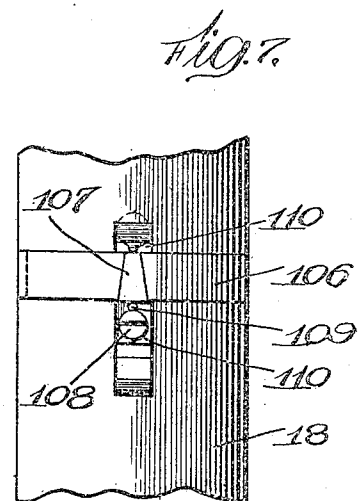
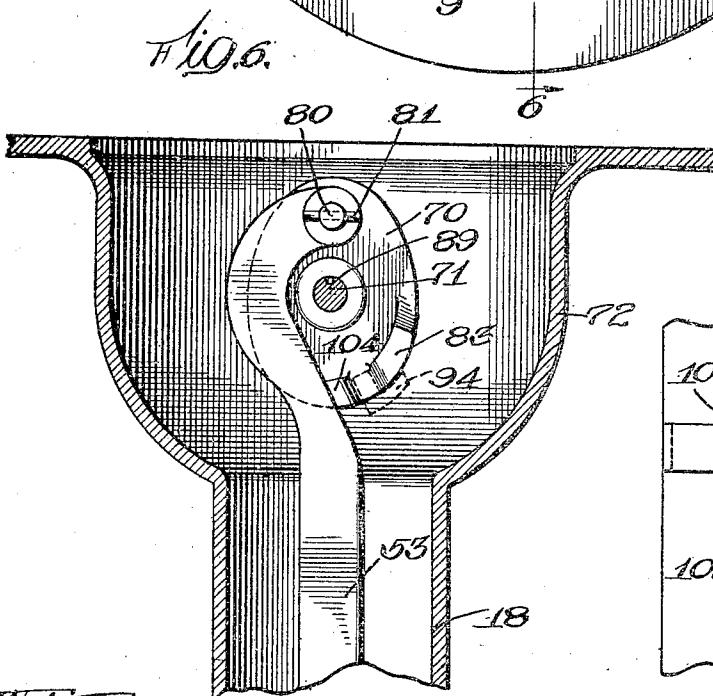
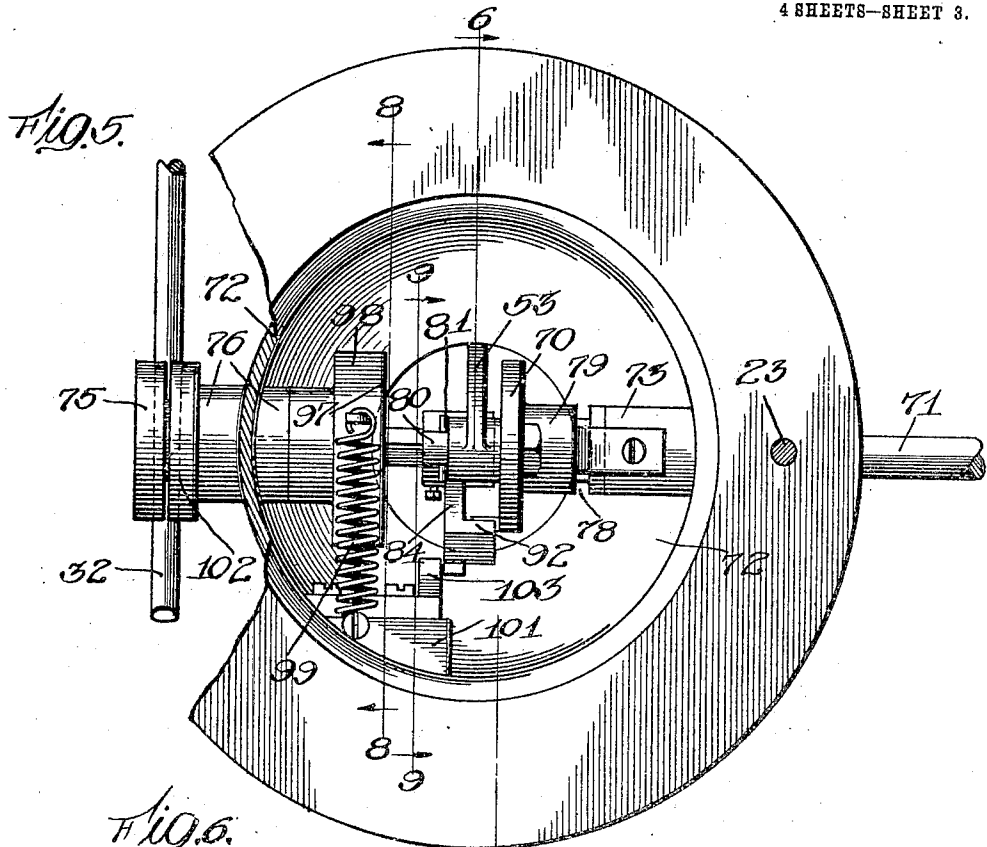
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H. H. ROSS.
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4 SHEETS—SHEET 3.



Witnesses:
C. V. Donnan.
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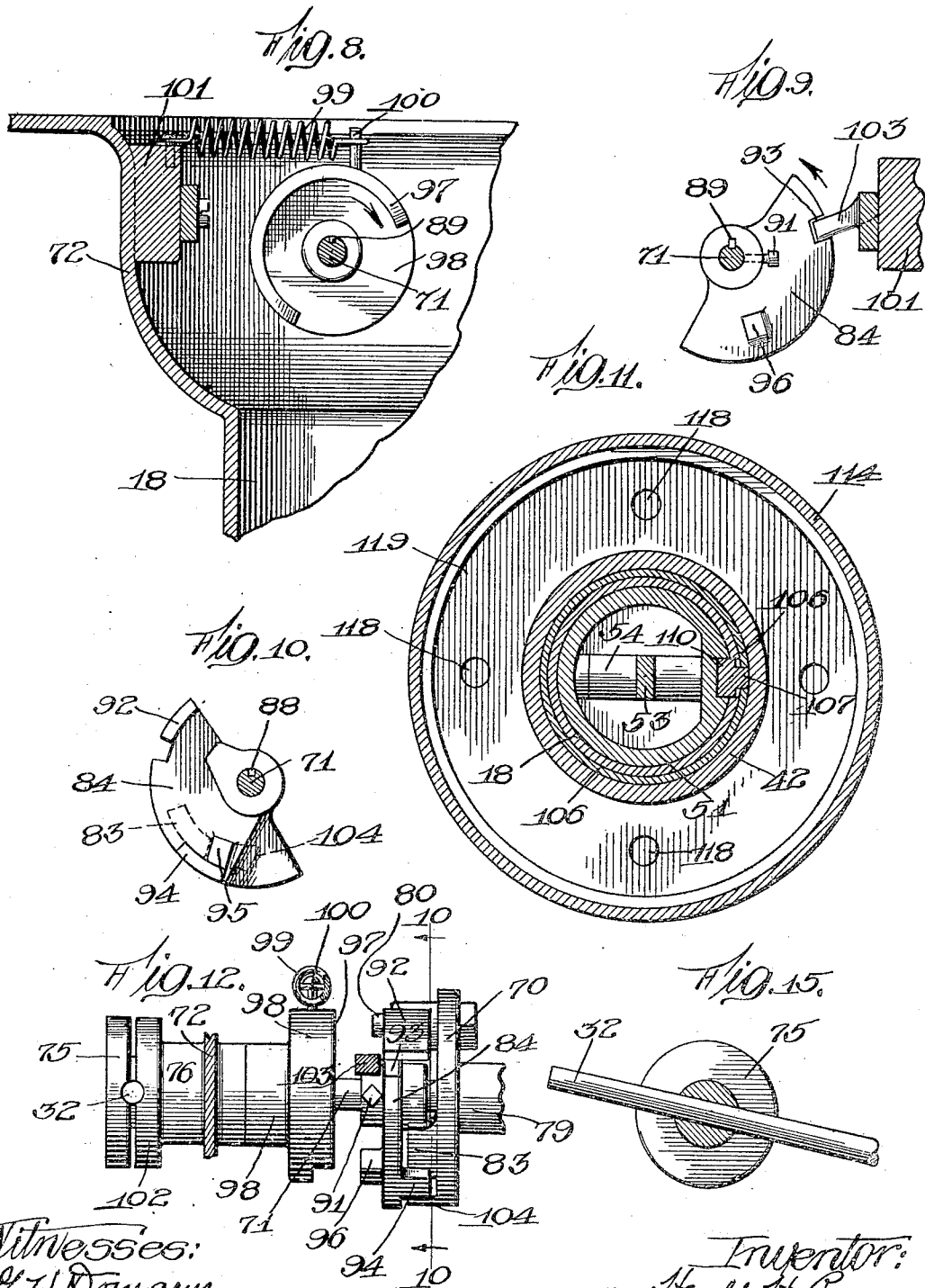
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H. H. ROSS.
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APPLICATION FILED APR. 9, 1906.

957,258.

Patented May 10, 1910.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

HEROLD H. ROSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THEO. A. KOCHS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

HYDRAULIC BARBER'S CHAIR.

957,258.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed April 9, 1906. Serial No. 310,823.

To all whom it may concern:

Be it known that I, HEROLD H. ROSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydraulic Barbers' Chairs, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to chairs, and particularly to the type known as dentists' chairs, although the particular chair herein illustrated and described is more particularly intended for barbers' use.

It has for its object to provide certain improvements in the mechanism for raising and lowering the chair as well as in other parts of the chair mechanism, as will be hereinafter pointed out.

What I regard as new is set forth in the claims.

In the accompanying drawings,—Figure 1 is a view illustrating the connections by which the back, the footrest and the seat are caused to operate in unison; Fig. 2 is a perspective view of the washer which forms a part of the locking mechanism for locking the seat and foot-rest in different positions of adjustment; Fig. 3 is an enlarged detail, being a vertical section of the base or support for the seat, showing the principal operating parts; Fig. 4 is a perspective view, showing one side of the rocking plate by which the different operations are effected; Fig. 5 is a plan view of the upper end of the seat-supporting plunger with the mechanism carried thereby; Fig. 6 is a partial vertical section on line 6—6 of Fig. 5; Fig. 7 is a partial side view of the plunger, illustrating the locking mechanism; Fig. 8 is a partial sectional view on line 8—8 of Fig. 5; Fig. 9 is a partial sectional view on line 9—9 of Fig. 5, illustrating the opposite side of the rocking plate from that shown in Figs. 4 and 10; Fig. 10 is a section on line 10—10 of Fig. 12, showing the same side of the rocking plate as shown in Fig. 4; Fig. 11 is a horizontal section on line 11—11 of Fig. 3; Fig. 12 is a detail, partly in section, showing certain parts of the operating mechanism assembled; Fig. 13 is a perspective view, illustrating one side of the crank disk; Fig. 14 is an edge view of the same; Fig. 15 is a view, partly in section, showing the arrangement of the rod by which the adjustment of

the back and footrest is controlled, and Fig. 16 is a side view of the wedge by which the plunger is locked against rotation.

As best shown in Fig. 1, my improved chair comprises a seat 15, a back 16, and a foot or leg rest 17,—said parts being mounted on a plunger 18 vertically movable in a base 19 to raise and lower the height of the seat. The back and the footrest are angularly adjustable so as to allow the occupant to assume either a reclining or an upright position, as desired. In order that they may operate in unison, and the seat be appropriately adjusted automatically, the parts are mounted as best shown in Fig. 1. As therein illustrated, the seat-frame is composed of side pieces 21 and a bottom 22 rigidly connecting said side pieces. The bottom is secured to the plunger 18 by bolts or other suitable means, so that it may be removed when desired. The back 16 is provided at each side edge with a plate 24 which is pivoted at 25 to the adjacent side piece so that the back may swing forward and backward. Each plate 24 is also pivoted by a pivot 26 to an upwardly-extending lug or arm 27 carried by a horizontal frame 28 adapted to support the seat proper. It will thus be seen that the pivots 26 support the rear portion of the frame 28. The forward portion of the frame 28 is supported by means of swinging straps 29, one of which is pivotally connected at its upper end to the forward portion of each side piece 20 and 21, as shown in Fig. 1.

31 indicates the pivots connecting the forward portion of the frame 28 with the straps 29. It will be noted that said pivots are placed a short distance below the pivots 26. The straps 29 are connected at their lower ends to the foot or leg rest 17. It will be observed that by this construction the frame 28 may swing forward and backward in substantially a horizontal plane, and when the back, for example, is swung backward—the pivots 26 being below the pivot 25—the frame 28 is moved forward, throwing the footrest 17 forward also, so that it assumes the reclining position. The movement of the back in the opposite direction reverses the movement of the footrest and seat-supporting frame. The frame 28 is preferably formed of angle-iron, or otherwise provided with an upright flange, as indicated in dotted lines in Fig. 1, in order to properly re-

ceive and retain the seat proper, which may be a removable cushion of any suitable construction.

In order to hold the parts in their different positions of adjustment, I provide a locking rod 32 connected at its forward end to a bracket 33 secured at the back of the footrest 17,—the rear end of said rod being arranged to be locked by mechanism which will be hereinafter described.

The mechanism for raising and lowering the chair seat, for controlling the rotation thereof, and for locking and unlocking the back and footrest, will now be described.

As best shown in Fig. 3, the plunger 18 on which the seat rests is fitted in a cylinder 42 which is closed except at its upper end,—said cylinder being fitted in the base 19 in any suitable way. At its upper end the cylinder is provided with a lateral flange 43 having a marginal flange 44 which serves to prevent overflow of oil with which the cylinder 42 is partly filled. The plunger 18 is hollow, and is closed at its lower end, as shown at 45 in Fig. 3, except that it has a suitable port preferably located centrally thereof and provided with a check-valve 46 opening downward. A spring 47 serves to hold the check-valve 46 up to its seat,—said spring being mounted upon the stem 48 of the check-valve and being held in position by a bar 48^a secured by screws 49, as shown. Any other suitable arrangement for supporting the spring may, however, be employed. As also shown in Fig. 3, the valve 46 is provided with an upward projection 50, preferably in the form of a series of radiating vanes, which extends a short distance above the bottom 45 of the plunger so that by pressing down on said projection the valve 46 may be pressed down off its seat to open the port and permit the escape of oil from the plunger into the chamber 42.

51 indicates a piston in the form of a cylinder closed at its lower end, as shown at 52 in Fig. 3. Said piston fits closely in the plunger 18, in which it is adapted to reciprocate, and is pivotally connected to a piston rod 53. Said piston rod at its lower end is provided with a transverse sleeve 54 having trunnions 55 which fit in suitable bearings in the piston. At its lower end the piston is provided with a port 56 normally closed by a check-valve 57 which is held in place by a suitable spring 58, preferably a flat spring, as shown in Fig. 3. Said spring at its outer end is suitably secured to the lower margin of the piston,—its inner end being secured to the valve 57, which also opens downwardly in the same way as the valve 56.

59 indicates a crossbar secured to the lower end of the piston and is adapted to engage and depress the projection 50 of the valve 46 when the piston is moved to its lowermost position. It will thus be seen that by mov-

ing the piston down to its lowermost position the valve 46 may be held off its seat, thereby permitting oil to pass from the cylinder 42 to the plunger 18. When the piston is in its lowermost position, a by-pass 61 is provided through which oil may pass above the piston. As shown in Fig. 3, said by-pass extends diagonally through the wall of the piston near the lower end thereof, and when the piston is in its lower position communicates with a circumferential recess 62 formed in the inner wall of the plunger at its lower end, as shown in Fig. 3. Thus when the piston is in its lowermost position an annular channel is provided in the plunger around the lower end of the piston through which oil may pass to the by-pass 61 and thence to the upper side of the piston.

The piston-rod 53 is reciprocated to operate the piston by means of a crank-disk 70 which is mounted on a transverse rod or shaft 71 which is suitably mounted in the enlarged upper end or head 72 of the plunger, as best shown in Fig. 3. As therein shown, there is an elongated bearing 73 in the head 72 of the plunger in which the shaft 71 is principally supported. The inner end of said rod extends to the other side of the head 72 and fits within a clamping sleeve 74 having a head 75 which operates as a clamp. Said sleeve is supported in a bearing 76 which is in alignment with the bearing 73. The purpose of the clamping sleeve is to lock the footrest rod 32, as will be hereinafter described.

The crank-disk 70 is loosely mounted on the rod or rock-shaft 71 and abuts against the inner end of the bearing 73, where it is held in position by a plate 77 which is secured to said bearing and projects into an annular groove 78 in the hub 79 of the crank-disk, as shown in Fig. 3. Said crank-disk carries a wrist-pin 80, upon which the upper end of the piston-rod 53 is pivoted.

81 indicates a cotter-pin to hold the piston-rod on the crank-disk.

As best shown in Fig. 6, the upper end of the piston-rod 53 is curved to circumvent the rod 71 so as to give the piston-rod a longer stroke.

As best shown in Fig. 13, the crank-disk 70 is provided with a notch 82 near its margin at a point substantially diametrically opposite the pin 80 (see also Fig. 6). Said notch is placed at the same side of the disk as the crank-pin 80,—being formed in a flange 83 which projects from said disk near its margin, as shown in Fig. 13. The object of the notch 82 is to provide for operatively connecting the rock-shaft or rod 71 with the crank-disk, as will be hereinafter described.

84 indicates a rocking plate, which forms the medium through which various operative connections are made between the rod

71 and the various parts of the operating mechanism. The form of said plate is best shown in Figs. 4, 9, 10 and 12. As illustrated in Fig. 4, said plate is substantially
 5 semicircular, having a substantially straight edge-portion 85 and a curved edge-portion 86. A hub 87 is provided near the straight edge 85, which hub is adapted to fit upon the rod 71, as shown in Fig. 3. The plate 84 is
 10 mounted on the rod 71 and is caused to rotate therewith by means of a key 88 fitting in suitable keyways 89—90 in the rod 71 and hub 87, respectively, as shown in Figs. 3 and 4. A set-screw 91, which passes through
 15 the hub 87 and into rod 71, as shown in Figs. 9 and 12, serves to prevent longitudinal movement of the rocking plate 84 upon the rod 71 after it has been properly adjusted. Said rocking plate may be moved
 20 toward and from the crank-disk by endwise movement of the rod or shaft 71, which is free to move longitudinally in its bearings. As best shown in Fig. 4, the rocking plate 84 is provided with a laterally-projecting
 25 lug 92 at its margin adjacent to the straight edge 85,—said lug projecting to the right as shown in Figs. 5 and 12. Adjacent to the lug 92 a notch 93 is provided in the margin of the plate 84, the purpose of which will be
 30 hereinafter described.

94 indicates a marginal flange formed on the plate 84 at a point about sixty degrees from the lug 92 and on the same face of said plate. Near one end of said flange is a lug
 35 95, which projects toward the hub 87 and is adapted to enter the notch 82 in the crank-disk when the plate 84 is turned to the proper position. On the opposite face of the plate 84 is provided a laterally-projecting
 40 lug 96, which corresponds as to its position substantially with the lug 95, as shown in Figs. 4 and 9. The function of the lug 95 is to engage the notch or recess 82 of the crank-disk 70 when the plate 84 is moved
 45 toward said crank-disk by drawing out the rod 71. By thus causing the lug 95 to engage the notch 82 it will be evident that the plate 84 and crank-disk will be caused to rotate or rock in unison,—the crank-disk being
 50 thereby locked to the rock-shaft 71. The function of the lug 96 on the opposite side of the rocking plate 84 is to engage a segmental marginal flange 97 carried by a nut 98 which is screwed upon the inner end
 55 of the sleeve 74 and bears against the inner end of the bearing sleeve 76, as shown in Figs. 3 and 12. The flange 97 extends through an arc of approximately two hundred and twenty-five degrees, so that said
 60 nut has a certain range of movement independently of the plate 84. The arrangement is such that when the plate 84 occupies the position shown in Fig. 9 the lug 96 will be in position to engage the lower
 65 end of the flange 97, so that by then rocking

the plate 84 in the direction indicated by the arrow in Fig. 9 the nut 98 may be rotated in the direction indicated by the arrow in Fig. 8, thereby unscrewing it on the sleeve 74. The nut 98 is rotated in the opposite direc-
 70 tion by means of a spring 99, one end of which is connected with a pin 100 projecting from the nut and the other end to a suitable stop 101 carried by the head 72 of the plunger, as shown in Fig. 8. The object of
 75 thus actuating the sleeve 74 is to cause it to grip or release the rod 32 which controls the position of the footrest. As shown in Figs. 5, 3 and 15, said rod passes through a
 80 suitable hole in the sleeve 74, so that its center is substantially in the plane of the inner face of the head of the sleeve, and corresponding grooves are formed in the inner face of the head to receive the rod 32. A
 85 disk or washer 102 is fitted upon the sleeve between the sleeve 76 and the head of the sleeve, as shown in Fig. 3, which washer is correspondingly grooved, as shown in Fig. 12. By this construction the head of the
 90 sleeve 74 and the disk or washer 102 act together as clamp members to firmly grip the rod 32 when the sleeve is drawn inwardly, as above described. The spring 99 serves to normally hold the sleeve in locking position,
 95 since it tends to screw the nut upon the sleeve, but the rod 32 may be released by rotating the nut in the opposite direction through the engagement therewith of the
 100 lug 96, as described. The lug 96 is brought into position to engage the lug 97 by endwise movement of the rod 71, which carries the rocking plate 84 out of engagement with the crank-disk 70.

In order to prevent accidental disengagement of the rocking plate 84 with either of
 105 the parts operated by it provision is made by which the rod 71 and with it the plate 84 can be moved longitudinally only when said plate 84 is in a certain position. As has been described, said plate is provided with
 110 a notch 93 adjacent to the lug 92, and when the rocking plate is moved to a certain position said notch comes into alinement with a lug 103 projecting inwardly from the head
 115 72 of the plunger, as shown in Figs. 5 and 9. Said lug is of such width that when the plate 84 is in engagement with the crank-disk 70 said lug is substantially in contact with the opposite face of said plate, and
 120 similarly when the plate 84 is in operative engagement with the nut 98 the lug 103 is adjacent to the opposite face of said plate. To bring the plate 84 into operative engagement with either the crank-disk 70 or the
 125 nut 98 the plate 84 must be turned so as to bring the notch 93 into alinement with the lug 103 when the rod 71 may be moved longitudinally to secure the desired adjustment; but as soon as the shaft is rocked to operate the parts with which connection is
 130

so made the notch moves out of alinement with the lug 103, and consequently the plate 84 remains locked in engagement with the part being operated until the notch 93 is again brought into engagement with said lug. The function of the laterally-projecting lug 92 of the plate 84 is to act as a limit stop when said plate 84 is in engagement with the nut 98. Under these conditions it will be noted that said lug 92 projects over the lug 103, and consequently the plate 84 cannot swing back beyond the point where the lug 92 engages the stop 103. By this means I prevent the nut 98 from being jammed too tightly on the locking sleeve 74 as would be apt to result if the nut were forced upon the sleeve by positive action of the lug 96. The spring 99 is sufficient to actuate the nut 98 and hold it in its locking position, and the lug 92 insures such actuation of the nut by the spring alone.

The function of the lug 94 of the plate 84 is to prevent excessive movement of the plate 84 in the opposite direction when said plate is in operative engagement with the nut 98. When said plate reaches the limit of its movement in the opposite direction the lug 94 strikes the under side of the stop 103 and prevents further movement of the plate.

In order to prevent the upper end of the piston-rod 53 from striking the hub 87 of the plate 84, and thereby interfering with the longitudinal movement of the rod 71, I provide a stop 104 adjacent to the notch 82 in the crank-disk 70, as shown in Figs. 13 and 14. Said stop 104 projects into the path of the piston-rod 53, as shown in Fig. 6, and prevents the upper end of said rod from coming into contact with the hub 87, as illustrated in Fig. 6.

As shown in Fig. 1, the rod 71 is provided at its outer end with a lever or crank 105, preferably formed by bending the outer end of the rod 71 at a right angle.

The operation of the raising and lowering mechanism and the locking devices for controlling the position of the back and footrest is as follows:—When the parts are in the position shown in Figs. 3, 5 and 12 the rocking plate 84 is in engagement with the crank-disk 70, the lug 95 lying then in the notch 82, and the plate 84 being at the right-hand side of the stop or lug 103. By then rocking the rod 71 by means of the hand lever 105 the piston may be reciprocated. If reciprocated by short strokes so that the bar 59 does not come into contact with the projection 50 of the valve 46, on the up stroke of the piston oil passes down below the valve 57, and on the down stroke of the piston is forced from the plunger down into the cylinder 42. By this means the plunger may be forced up. To lower the plunger the hand lever 105 is thrown downward so as to depress the piston far

enough to cause the bar 57 to engage and depress the valve 46, thereby opening said valve and permitting oil from the cylinder 42 to pass up into the plunger. The oil so passing up flows through the by-pass 61 in the piston to the upper side of the piston, thereby permitting the plunger, and with it the piston, to descend. The descent of the plunger may be stopped by raising the piston sufficiently to release the valve 46. If it be desired to adjust the footrest and back the hand lever 105 is turned so as to bring the notch 93 of the plate 84 into alinement with the stop 103, and the rod 71 is then moved endwise to shift the plate 84 to the other side of said stop 103 and bring its lug 96 into position to engage the flange 97 of the nut 98. By then throwing the lever 103 forward the nut may be partly rotated to unscrew it upon the sleeve 74, thereby releasing the rod 32. Thus these different operations may all be accomplished by means of a single lever.

It is desirable also that means be provided for locking the plunger against rotation, and I have provided means by which this also may be accomplished by the actuation of the same hand lever which controls the other operations above described. Such locking mechanism comprises a split ring 106 fitted in a peripheral groove in the plunger 18, as shown in Figs. 3 and 7. Said ring is adapted to be engaged by a wedge 107 carried by the piston 51, as shown in Figs. 3 and 7. The narrow edge of said wedge is uppermost, so that by moving up the piston said wedge is carried between the separated ends of the ring 106, causing said ring to expand and engage the inner surface of the cylinder 42, thus locking it against rotation. The wedge 107 is detachably secured to the piston by screws 108, as shown in Fig. 3,—said screws passing through slots 109 in the opposite end portions of a plate 110, which is preferably formed integral with the wedge 107,—said wedge being substantially centrally located, as shown in Fig. 16. In the lower end of the wedge-plate 110 is a screw 111, which may be adjusted so as to cause it to project to a greater or less extent below the lower end of the wedge-plate 110, and thus abut against a shoulder 112 formed on the piston 51, as shown in Fig. 3. The object of providing the slots 109 is to permit the wedge-plate 110 to be adjusted longitudinally to compensate for wear by means of said adjusting-screw.

As best shown in Fig. 3, the cylinder 42 is inclosed by a suitable casing comprising an annular pedestal 113, which surrounds the lower portion of the cylinder, a cylindrical shell 114, preferably of wood, which rests upon the pedestal 113, and a collar 115 which rests upon the casing 114. The upper portion of the collar 115 fits closely

around the flange 43 of the cylinder 42 and is provided with inwardly-projecting lugs 116 which extend under the outer margin of the flange 43, as shown in Fig. 3. The casing 114 holds the collar 115 up so that the lugs 116 bear closely against the under side of said flange 43,—the casing 114 being itself supported by the pedestal 113. By this means I provide a very close and efficient casing for the cylinder. In assembling the parts the casing 114 is fitted upon the cylinder from above before the plunger is applied thereto and also before the pedestal 113 is put in place. Said casing is then dropped down below its proper position and the collar 115 fitted over the flange 43 by suitably tilting it to permit the lugs 116 to pass said flange. The collar and casing are then lifted into position and the pedestal 113 put in place, thereby holding all of said parts together. The pedestal is itself held in place by a bottom-plate 117 secured by screws 118 to a flange 119 at the lower end of the cylinder, as shown in Fig. 3. Preferably the bottom-plate 117 carries a board, or other suitable covering, 120 on which the lower margin of the pedestal 113 rests, as shown in Fig. 3.

I have described in detail my improved chair, as illustrated in the accompanying drawings, but I wish it to be understood that I have not done so with the intention of restricting myself to the specific embodiment thereof illustrated and described, except in so far as it is particularly claimed, as my invention includes generically the subject-matter of the broader claims.

That which I claim as my invention and desire to secure by Letters Patent is,—

1. The combination of a cylinder, a plunger fitted in said cylinder, a piston in said plunger and adapted to be reciprocated to raise the plunger, a longitudinally-movable rock-shaft, means connected with the piston and adapted to be connected with the rock-shaft whereby said piston may be reciprocated by rocking said shaft, means operated by longitudinal movement of the rock-shaft for connecting it with or disconnecting it from said piston, clamping mechanism, and clutch-mechanism operated by longitudinal movement of said rock-shaft for connecting it with or disconnecting it from said clamping mechanism whereby said clamping mechanism may be operated by the rocking of said shaft.

2. The combination of a cylinder, a plunger fitted therein, a piston operating in said plunger, a rock-shaft carried by the plunger, clamping mechanism carried by the plunger, means adapted to connect said piston with said rock-shaft whereby said piston may be actuated by the rocking of said shaft, and clutch-mechanism adapted to connect said rock-shaft with said clamp-

ing mechanism, said rock-shaft being movable longitudinally into operative connection with either said piston or said clamping mechanism or out of operative connection therewith.

3. The combination of a cylinder closed at one end, a plunger fitted in said cylinder, a piston in said plunger and adapted to be reciprocated to move said plunger in said cylinder, valve mechanism coöperating with said piston for controlling the flow of fluid between the cylinder and plunger, a piston-rod connected with said piston, a rock-shaft, a locking sleeve carried by said rock-shaft, a nut for said sleeve, and means carried by said rock-shaft and movable into operative relation either with said piston-rod or with said nut, whereby said piston-rod may be reciprocated or said nut rotated by the rocking of said shaft.

4. The combination of a cylinder closed at one end, a plunger fitted in said cylinder, a piston in said plunger and adapted to be reciprocated to move said plunger in said cylinder, valve mechanism coöperating with said piston for controlling the flow of fluid between the cylinder and plunger, a piston-rod connected with said piston, a rock-shaft, a crank-disk mounted on said rock-shaft and connected with said piston-rod, a locking sleeve loosely mounted on said rock-shaft, a nut carried by said sleeve, and intermediate means keyed upon said rock-shaft and movable into engagement either with said crank-disk or said nut, whereby said piston may be reciprocated or said nut rotated by rocking said shaft.

5. The combination of a cylinder, a plunger fitted therein, a piston reciprocating in said plunger, valve mechanism, a piston-rod connected with said piston, a rock-shaft, a crank-disk loosely mounted on said rock-shaft, a plate mounted on said rock-shaft adjacent to said crank-disk, said crank-disk having a lug 104 adjacent to said plate forming a notch 82, said plate having a lug 95 adapted to enter said notch, a locking sleeve in which one end of said rock-shaft is fitted, a nut mounted on said sleeve, and means carried by said plate adapted to engage said nut for rotating the same, said rock-shaft being movable longitudinally to carry said plate into engagement either with said crank-disk or with said nut.

6. The combination of a cylinder, a plunger fitted therein, a piston reciprocating in said plunger, valve mechanism, a piston-rod connected with said piston, a rock-shaft, a crank-disk loosely mounted on said rock-shaft, a plate mounted on said rock-shaft adjacent to said crank-disk, said crank-disk having a notch 82 and lug 104 adjacent to said plate, said plate having a lug 95 adapted to enter said notch, a locking

sleeve in which one end of said rock-shaft is fitted, a nut mounted on said sleeve, means carried by said plate adapted to engage said nut for rotating the same, said rock-shaft
 5 being movable longitudinally to carry said plate into engagement either with said crank-disk or with said nut, and means for holding said plate in operative connection with either of said parts when in operation.

10 7. The combination of a cylinder, a plunger vertically movable therein, a piston for moving said plunger in said cylinder, coöperating valve mechanism, a piston-rod, a rock-shaft provided with a crank disk, a
 15 locking sleeve, a nut for actuating said sleeve, intermediate means mounted on said rock-shaft and movable therewith to connect said rock-shaft either with said crank disk or with said nut, and means for holding said
 20 intermediate means in either position while in operation.

8. The combination of a cylinder, a plunger movable therein, a piston in said plunger and adapted to be reciprocated
 25 therein to move said plunger in said cylinder, coöperating valve mechanism, an expansible ring carried by said plunger, and means carried by said piston for expanding said ring.

30 9. The combination of a cylinder, a plunger movable therein, a piston in said plunger and adapted to be reciprocated therein to move said plunger in said cylinder, coöperating valve mechanism, an ex-
 35 pansible ring carried by said plunger, and means carried by said piston and actuated by excessive upward movement of said piston for expanding said ring.

40 10. The combination of a cylinder, a plunger movable therein, a piston in said plunger and adapted to be reciprocated therein to move said plunger in said cylinder, coöperating valve mechanism, a split
 45 ring mounted on said plunger, and a wedge carried by said piston and movable between

the separated ends of said ring for expanding the same.

11. In a chair base, the combination of a cylinder having a peripheral flange at its upper portion, a collar adapted to fit around
 50 the upper end portion of said cylinder and having inwardly-projecting means adapted to engage said flange, a casing surrounding said cylinder and fitting within and sup-
 55 porting said collar, and means for supporting said casing.

12. In a chair, the combination of a seat having an angularly-adjustable back and foot-rest, a plunger carried by said seat, a
 60 cylinder in which said plunger is adapted to reciprocate, a piston in said plunger and adapted to be reciprocated therein to move said plunger in said cylinder, coöperating
 65 valve mechanism, means actuated by said piston for locking said plunger against rotation, a longitudinally-movable rock-shaft for operating said piston and means oper-
 70 ated by said rock-shaft for locking said back and foot-rest in their different positions of adjustment.

13. In a chair, the combination of a seat having an angularly-adjustable back and foot-rest, a plunger carried by said seat, a
 75 cylinder in which said plunger is adapted to reciprocate, a piston in said plunger and adapted to be reciprocated therein to move said plunger in said cylinder, coöperating
 80 valve mechanism, means actuated by said piston for locking said plunger against rotation, a locking rod connected with the foot-rest, a longitudinally-movable rock-shaft for operating said piston, and means
 85 operated by said rock-shaft for engaging and clamping said rod for locking said back and foot-rest in different positions of adjustment.

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Witnesses:

JOHN L. JACKSON,
 MINNIE A. HUNTER.