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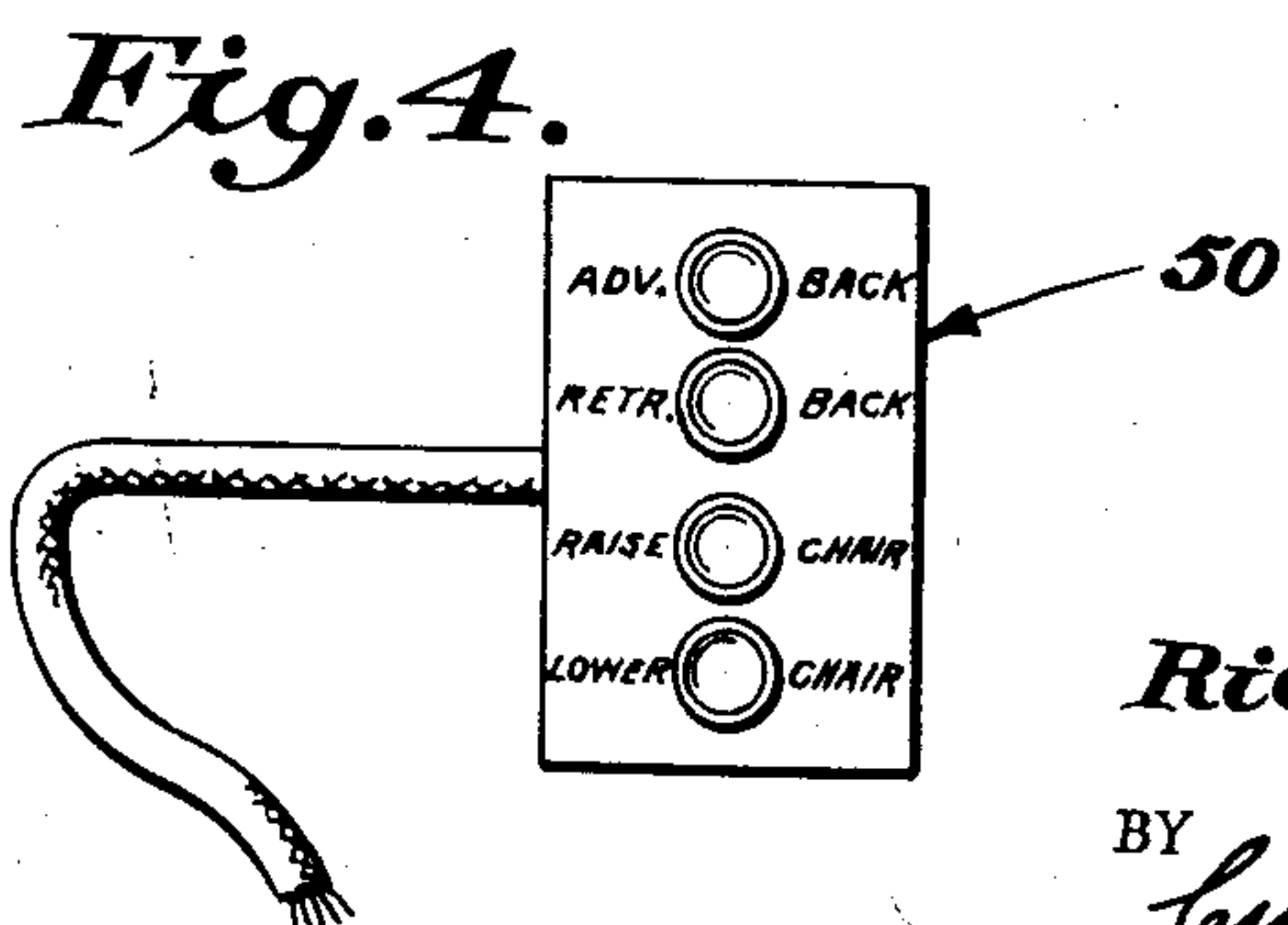
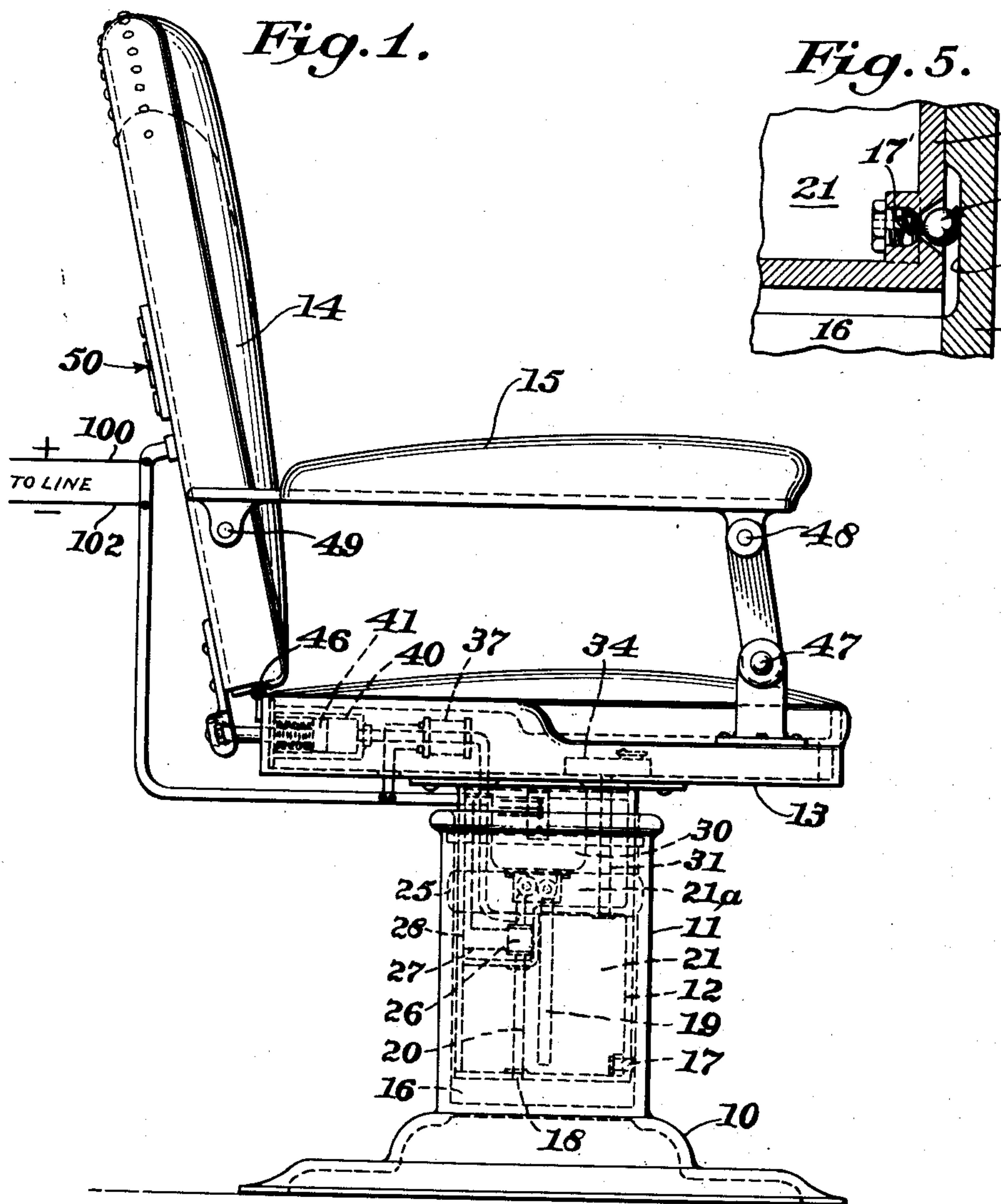
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2,653,648

ELECTRIC-HYDRAULIC BEAUTY CHAIR

Filed July 20, 1950

2 Sheets-Sheet 1



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Fig. 2.

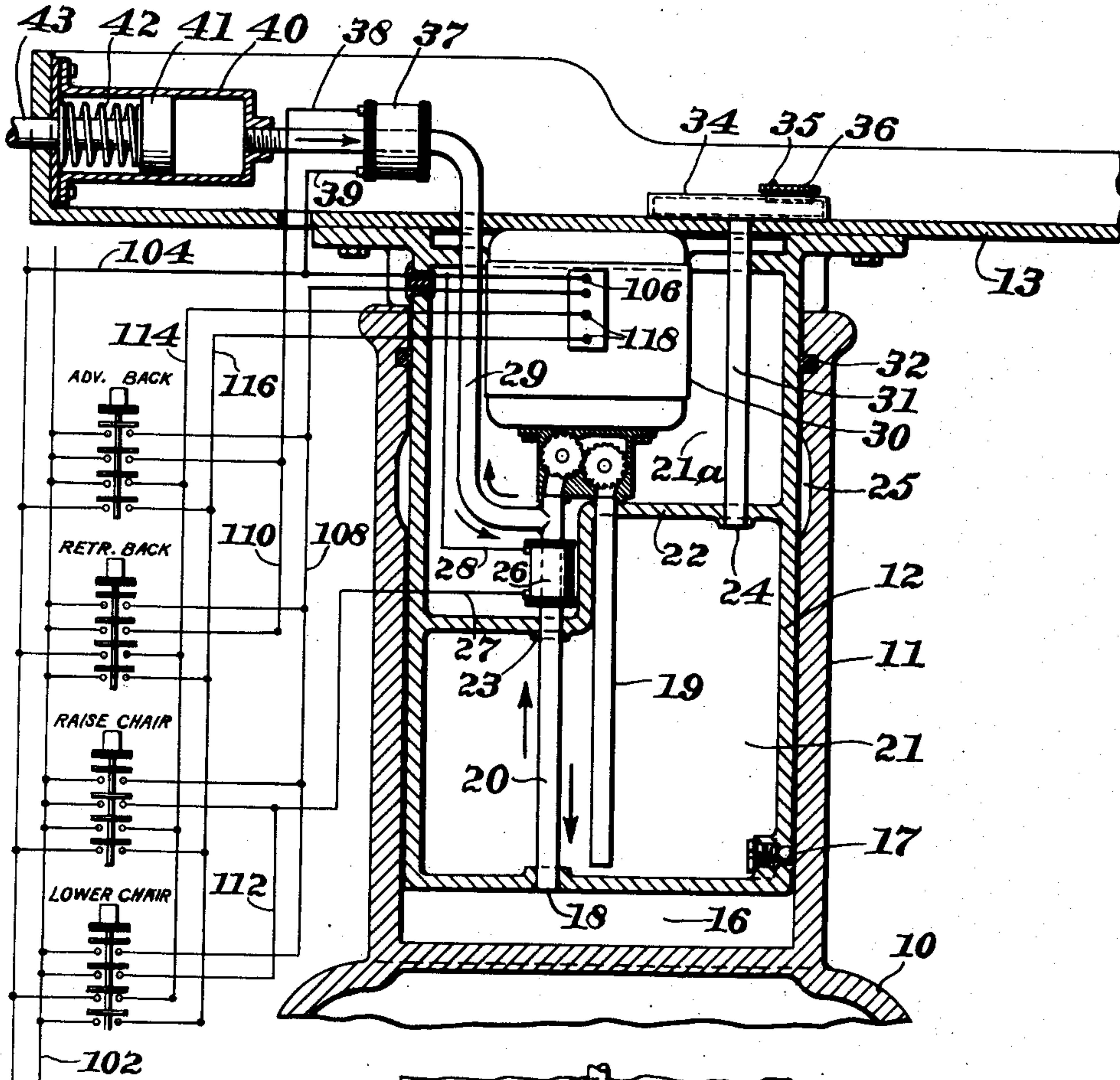
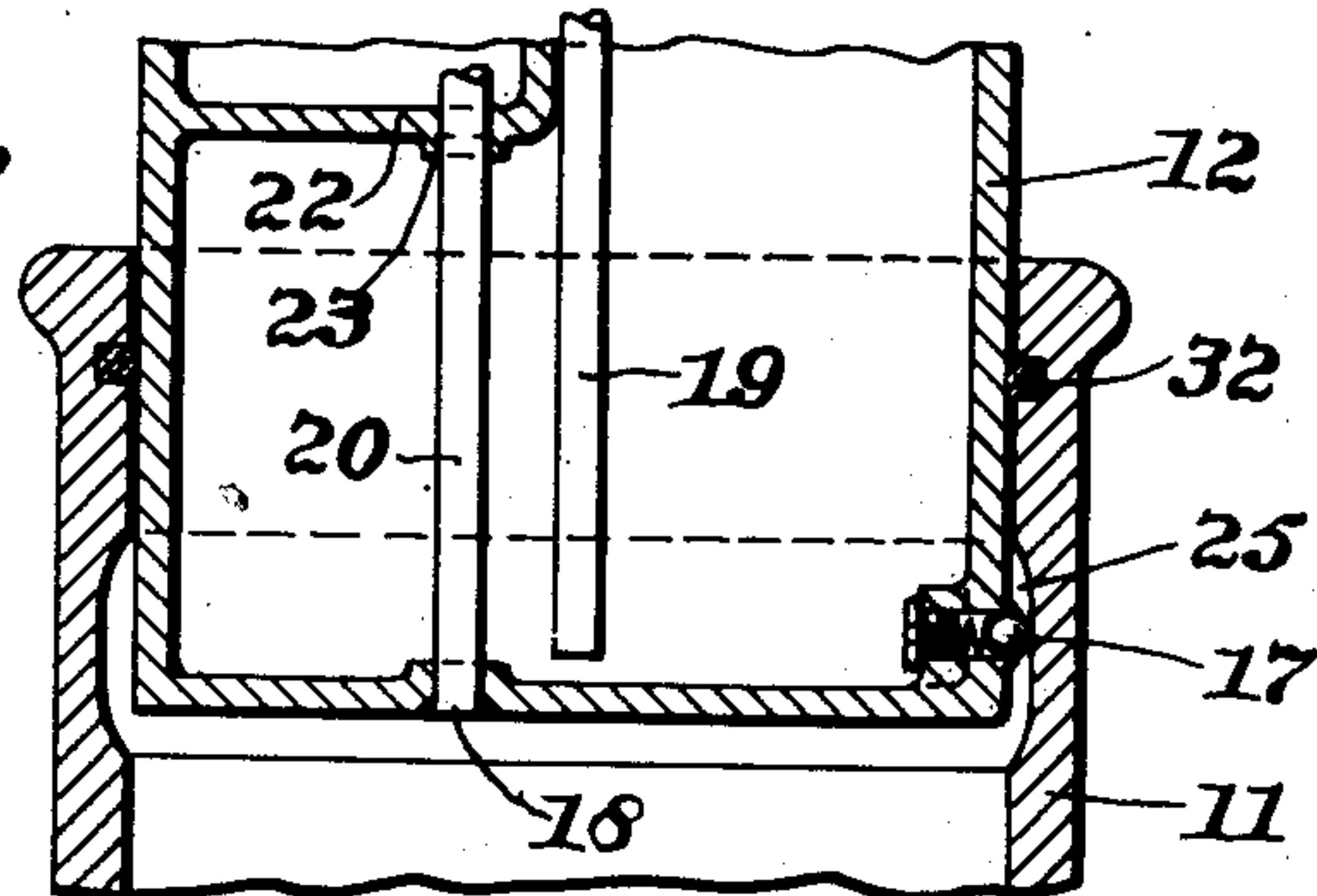


Fig. 3.



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ELECTRIC-HYDRAULIC BEAUTY CHAIR

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6 Claims. (Cl. 155—25)

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The present invention relates to an improved electrically controlled hydraulic chair of the type particularly adapted for use in beauty parlors and the like, but which may also be used as dental, surgical and barber chairs.

A primary object of this invention is to provide an improved chair of the type described which eliminates practically all manual control means associated with chairs of this nature now in use. The present invention replaces these controls with a series of electric switch buttons convenient to the operators' working position which control all movements of the seat in an up and down direction and also the adjustment of the back and armrests.

A further object of this invention is to provide a lift column or piston having a compact motor hydraulic pump unit situated therein to deliver hydraulic fluid under pressure to the back and seat cylinders.

A further object of this invention is to provide in a hydraulic chair of the type described a hollow lift piston which serves as a reservoir for the hydraulic fluid and at the same time is adapted to contain a compact very efficient reversible electric hydraulic motor pump unit.

A still further object is to provide electrically controlled valve means associated with the hydraulic system whereby the movement of the chair seat or the adjustment of the back may be effected simultaneously or separately by pushing appropriate switches located convenient to the operator.

A further object of the invention is to provide a chair of the type described which is completely self contained, compact and appealing to the eye and the comfort of the patron.

A still further object of the invention is to provide a chair having more effective means for controlling the movements of the seat and back in order that the chair or back may be positively positioned rapidly and smoothly without resorting to foot pedals, hand levers or cumbersome switching means.

These and other objects are arrived at by means of certain improvements and combinations of parts, all as will be hereinafter more fully described, and claimed. In the drawings:

Figure 1 is a side elevation of a chair embodying this invention, etc.

Figure 2 is an enlarged detail sectional view of the lift column and back control means taken substantially through the center of the column, and a diagrammatic showing of the electrical wiring circuits associated therewith.

Figure 3 is an enlarged, fragmentary sectional view showing the lower end of the lift column in its elevated position.

Figure 4 is a fragmental detail of the button control means for the electrically controlled valves and the reversible motor power unit.

Fig. 5 is an enlarged fragmental sectional view

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of the check valve in the open position as shown in Figure 3.

Similar reference numerals throughout the several views indicate the same parts.

The present invention provides an improved electrically controlled hydraulic chair having a very compact motor pump unit and oil storage area, all located in the lift column of the chair, yielding a chair pleasing to the eye which is light and of relatively simple construction. No unsightly foot pedals or hand levers are employed which makes this chair particularly adapted for use in the closed off areas provided in most beauty salons for the convenience and privacy of the individual patron.

The switch means for controlling the elevation of the seat and back rest are conveniently located to enable the operator, by the use of one finger, to positively control all the movements of the chair with very small adjustments in position being possible.

Referring to the drawings, 10 represents the base of the chair which may sit on the floor with or without holding bolts, 11 is a hollow cylinder secured to the base 10 by welding or other suitable means. A hollow piston 12 is positioned in cylinder 11 for reciprocation therein. A seat platform 13 is secured to top flanges of the hollow piston 12 and a back rest 14 is pivoted to the platform 13 at 46. Suitable pivoted armrests 15 (only one shown in Fig. 1) are pivoted to the back 14 and the seat platform 13 at 49 and 47 respectively.

Hollow piston 12 is provided with a fluid tight partition 22 dividing the hollow piston into an upper chamber 21a and a lower chamber 21. A suitable lift area 16 is provided at the base of hollow piston 12 to receive hydraulic fluid under pressure. A spring operated ball check valve 17 prevents the piston 12 from being forced out of cylinder 11 by engaging the recessed portion 25 in the upper inner circumference of cylinder 11 permitting the fluid to return to the sump area 21. Referring specifically to Fig. 5, the spring operated ball check valve 17 is shown in the open position whereby hydraulic fluid may flow from the area 16 below the piston 12 into the annular recess 25 through the check valve into the sump area 21. Since the pressure can not build up further in the area 16 as it now has a place to vent, namely, the sump 21, the upward movement of the piston 12 will be limited. In other words, there will be a re-circulation of hydraulic fluid from the sump 21 to the area 16 below the piston back again to the sump 21. As shown in the drawings, the valve 17 may include a spring pressed ball which will seat in the lower end of the vertical wall of the piston 12. The spring 17' will unseat the ball when the ball engages the annular recess 25. A packing gland 32 just above the recess 25 pre-

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vents the escape of hydraulic fluid from the top of the cylinder 11.

Lower chamber 21 of piston 12 constitutes a sump tank for holding hydraulic fluid while an auxiliary sump 34 located on seat platform 13 beneath the seat cushion is connected with the main sump 21 by means of pipe 31 extending through fluid tight partition 22 at 24. This provides extra area for holding fluid in addition to its function as a convenient filling means if, for any reason, some hydraulic fluid should be lost from the system. A vent 35 on filling cap 36 prevents the formation of a vacuum in the system.

The upper chamber 21a formed by partition 22 contains the unitary reversible motor hydraulic pump unit 30 which is of a general well known type. In the embodiment shown in the drawings a pipe member 19 extends from power unit 30 into the lower sump chamber 21 for moving hydraulic fluid to and from the sump tank. A second pipe 20 delivers hydraulic fluid to the lift area 16 of the piston 12, passing through the lower sump chamber at 23 and 18. Other arrangements of a similar nature for moving the hydraulic fluid to and from the power unit may be made without departing from the spirit and scope of this invention.

An electrically controlled valve unit 26, which may be any well known conventional type solenoid valve, is normally closed. This valve controls the movement of hydraulic fluid through the system leading to the lift area 16 of the piston 12. By reversing the motor-pump unit 30 and opening valve unit 26 fluid may be withdrawn from the lift area 16 through pipe 20 and returned to the sump chamber 21.

A second hydraulic power line 29 is connected to the motor pump unit to deliver fluid under pressure to the cylinder 40 to force piston 41 against the action of spring 42. The movement of piston 41 controls the movement of the rod 43 which in turn determines the position of the back rest 14 pivoted at 46 and the armrests 15 (only one being shown in Fig. 1) which are pivoted at points 47, 48 and 49. A second electrically controlled conventional solenoid valve unit 37, also normally closed, located on the hydraulic power line 29, controls the movement of hydraulic fluid to and from the cylinder 40.

A suitable electric switching system for operating the foregoing apparatus will now be described in greater detail. The four push button switches, which are generally indicated at 50 in Figures 1 and 4, are each four pole-single throw normally open switches. These switches are diagrammatically illustrated in Figure 2 in the same order from top to bottom as they appear in Figure 4. Power from incoming mains 100 and 102 (Figure 2) is interconnected with the switches and the previously mentioned motor and solenoid controlled valves in the following manner: A connection is made from lead 100 through lead 104 to one side of solenoid 37, solenoid 26, and motor armature terminal 106. When any of the push button switches are operated, it will be noted from the drawing (Figure 2) that the first or upper pole of each switch will complete a circuit through the motor armature by means of bus 108. It will further be noted that operation of either of the upper or "back" push buttons will cause the second pole to complete a circuit to the "back" solenoid 37 through bus 110. Corresponding operation of the two lower or "chair" buttons will cause the second

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pole of these switches to complete a circuit through the chair solenoid 26 by means of bus 112. The direction of movement of the chair or back, as the case may be, is controlled upon the operation of any button by the third and fourth poles. This is accomplished by having the motor field leads 118 connected through busses 114 and 116 and then alternately through the third and fourth poles to the mains 100 and 102.

In the switching system just described, it will be understood that the motor 30 is of the so-called universal type wherein reversal of the field connections, with respect to the armature connections, will cause reversal of the motor. It will be apparent that any other type of motor may be employed with similar switching means to cause selective reversal upon operation of the desired push button.

The operation of the chair is simple and requires no bending over to reach levers. Neither does this improved chair require the use of any foot pedals which would necessitate the operator moving around the chair to reach the pedals. When it is desired to raise the chair the operator merely presses the "raise chair" button (Fig. 4) which starts the motor pump unit in a direction so as to move hydraulic fluid from the sump area 21 through pipes 19 and 20 to the lift area 16 beneath piston 12. Simultaneously with the starting of the motor pump unit 30 valve 26 is opened allowing the fluid under pressure to pass through. As soon as the operator releases pressure on the "raise chair" button, valve 26 closes and the pump stops, holding piston 12 at the desired elevation. Of importance are the means provided for positively lowering the chair. This is accomplished by pressing the "lower chair" button (Fig. 4) which reverses the direction of the motor-pump unit 30 and again opens valve 26 which permits fluid to be withdrawn from lift area 16 through pipe 20 and returned to sump tank 21, until the chair is lowered to the desired level.

The operation of the back and armrests is essentially the same. The operator presses the "advance back" button (Fig. 4) which energizes the motor-pump unit 30 in a direction so as to deliver fluid under pressure from the sump area 21 through pipes 19 and 29 to the cylinder 40 forcing piston 41 against the action of spring 42. Valve 37 is simultaneously opened at the time the motor-pump unit 30 starts, permitting free flow of the hydraulic fluid to the cylinder 40. When the operator releases the "advance" button, valve 37 closes and motor-pump unit 30 stops, thereby trapping the fluid under pressure in cylinder 40, holding the back and armrests in the desired position. Movement of the back rest in the opposite direction is effected by pressing the "retract back" button which again opens valve 37 and reverses motor-pump unit 30 which removes the hydraulic fluid from cylinder 40 to the sump tank 21 through pipe lines 29 and 19. The spring assisted piston 41 moves to fill the void space occupied by the hydraulic fluid. This moves lever 43 thereby pivoting back 14 to the desired position.

While the electric hydraulic system has been described for use with chairs such as those used in beauty parlors, barber shops and hospitals, the novel features of the system may find wider application in hydraulic lifts for motor vehicles of the type used in garages as well as transportable hydraulic jacks. It has been found that

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the motor-hydraulic pump unit may be made very small and compact for use in such systems. When the system of this application is employed in other hydraulic apparatus such as lifts and jacks, advantages are derived similar to those discussed when used with a chair. The normally closed electrically controlled valve 26 prevents lowering of the lift column even though for any reason electric power should fail. This safety factor is of extreme importance when workmen are operating beneath some heavy object being held up by a hydraulic lift.

I claim:

1. An electrically controlled hydraulic lift device adapted for use in a chair comprising a base, a cylinder mounted on said base, a hollow piston mounted in said cylinder for reciprocatory movement, a fluid tight partition in said hollow piston forming an upper and a lower chamber, said lower chamber constituting a sump tank for holding hydraulic fluid, a unitary reversible hydraulic power unit located in said upper chamber, means extending from said hydraulic power unit through said fluid tight partition into the lower sump chamber to deliver fluid to and from said sump tank, and pressure delivery means extending from said hydraulic power unit through said lower sump chamber for discharging hydraulic fluid under pressure at the base of said hollow piston, a solenoid valve mounted within said pressure delivery means to control the passage of fluid therein, and means operatively connecting the area below the base of said hollow piston and the lower sump chamber when said hollow piston has raised in said cylinder to a predetermined height whereby hydraulic fluid under the base of said piston is returned to said lower sump.

2. In an electrically controlled hydraulic lift device adapted for use in a chair, a cylinder, said cylinder having an annular recess around the circumference of its inner wall and positioned in the upper end thereof, a hollow piston for reciprocation therein, a fluid tight partition dividing the interior of said hollow piston into an upper and a lower chamber, said lower chamber comprising a storage area for hydraulic fluid, a unitary reversible motor hydraulic pump unit in said upper chamber to receive hydraulic fluid from said lower chamber and deliver said fluid under pressure at the base of said piston to effect raising of said piston, an electrically controlled solenoid valve associated with said hydraulic pump unit, electrical switch means for controlling the direction of rotation of said reversible hydraulic pump unit and said solenoid valve simultaneously and means operatively connecting the area below the base of said hollow piston and the lower chamber when said hollow piston has raised in said cylinder to a predetermined height whereby hydraulic fluid under the base of said piston is returned to said lower chamber, said means including a spring actuated check valve mounted in the vertical wall of the said lower chamber of said piston adjacent the lower end thereof to engage the annular recess in the wall of said cylinder and open.

3. An electrically controlled hydraulic chair for beauty shops comprising a base, a cylinder mounted on said base, a hollow piston mounted in said cylinder, a fluid tight partition inside said hollow piston forming an upper and a lower chamber, a unitary reversible motor hydraulic pump unit in said upper chamber, said lower chamber constituting a sump tank, a seat mount-

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ed on said piston with a back and armrests pivotally mounted thereon, a spring-assisted hydraulic cylinder and piston associated with said back and armrests, electric valve means to control the flow of hydraulic fluid into and out of said spring-assisted hydraulic cylinder, electrical switch means controlling the operation of said valve for positioning said back and armrests and for determining the direction of rotation of said reversible motor hydraulic pump unit.

4. In an electrically controlled hydraulic beautician's chair, a cylinder, a hollow piston reciprocating therein, a fluid tight partition dividing the interior of said hollow piston into an upper and a lower chamber, said lower chamber comprising a storage area for hydraulic fluid, a unitary reversible motor hydraulic pump unit in said upper chamber, a seat mounted on said piston, and an auxiliary sump and filling tank under said seat communicating with the main sump tank in said hollow piston.

5. In an electrically controlled hydraulic lift device adapted for use in a chair, a cylinder, a packing gland extending around the top inside circumference of the cylinder, said cylinder having an annular recess around the circumference of its inner wall and positioned below said packing gland, a hollow piston for reciprocation in said cylinder, a fluid tight partition dividing said hollow piston into an upper and a lower chamber, said lower chamber comprising a storage area for hydraulic fluid, a unitary reversible motor hydraulic pump unit in said upper chamber to receive hydraulic fluid from said lower chamber and deliver said fluid under pressure at the base of said piston to effect raising of the piston, a check valve positioned in the wall of the lower chamber of said hollow piston adjacent the lower end thereof, said check valve including a spring-urged ball to engage the annular recess in said cylinder and open said check valve whereby hydraulic fluid will return from below the base of said piston to the lower chamber of said piston and limit the elevation of the piston in said cylinder.

6. An electrically controlled hydraulic chair particularly adapted for use in beauty shops comprising a base, a cylinder mounted on said base, a hollow piston mounted in said cylinder, a fluid tight partition inside said piston forming an upper and a lower chamber, a seat mounted on said piston, a pivoted back and armrests mounted on said seat, a second hydraulic piston for controlling the movement of said back and armrests, hydraulic fluid delivery means operatively connected to each of said pistons, a series of electrically controlled solenoid valves mounted in the hydraulic fluid delivery means to maintain said back and armrests in position and to control movement of said first piston, electrical switch means connected to each of said valves for opening and closing the same whereby the back and armrests have movement independent of the movement of said first piston.

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