

June 8, 1965

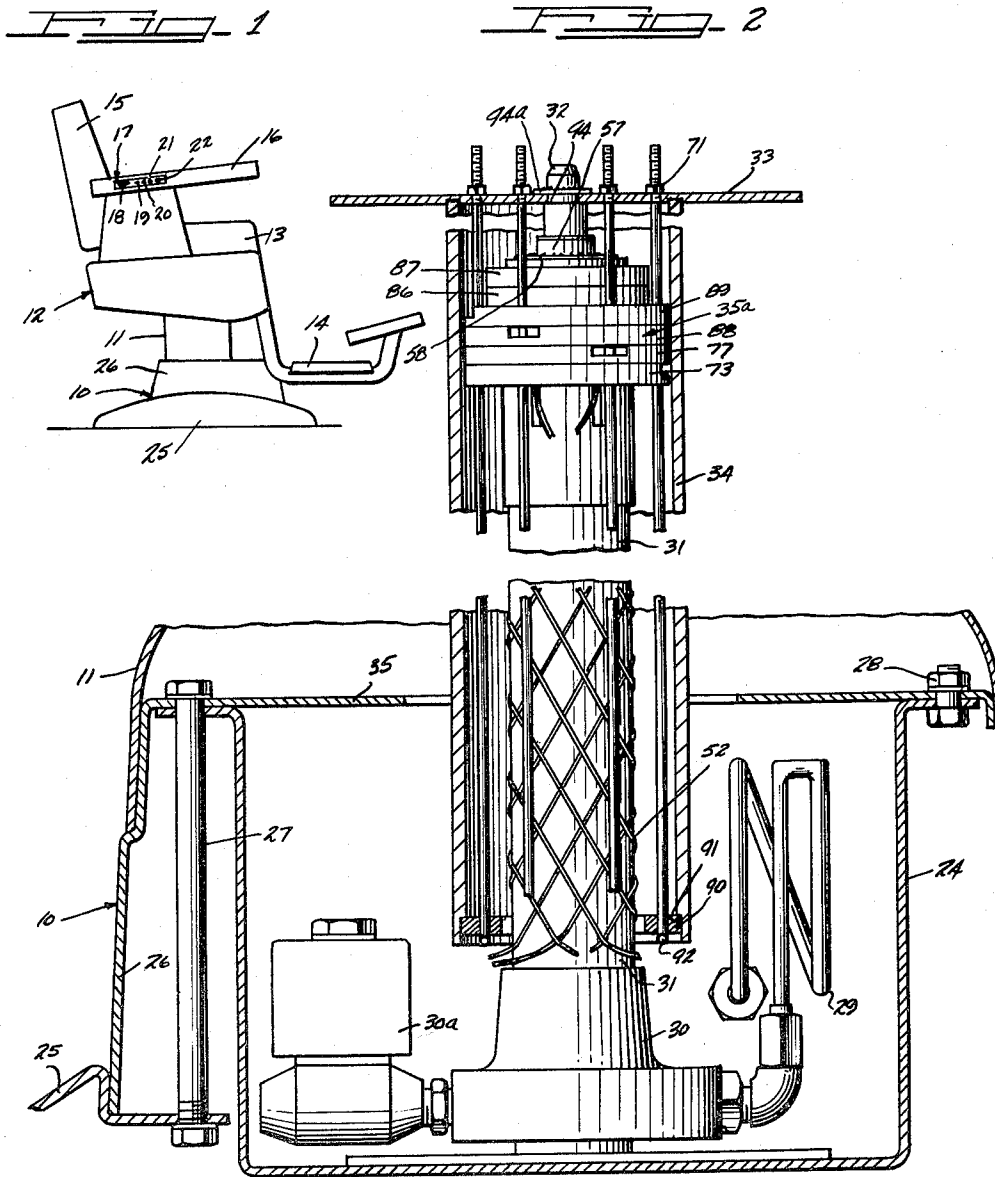
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3,188,043

BARBER CHAIR WITH ELECTRICAL OPERATION

Filed Aug. 30, 1961

3 Sheets-Sheet 1



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FIG. 3

FIG. 4

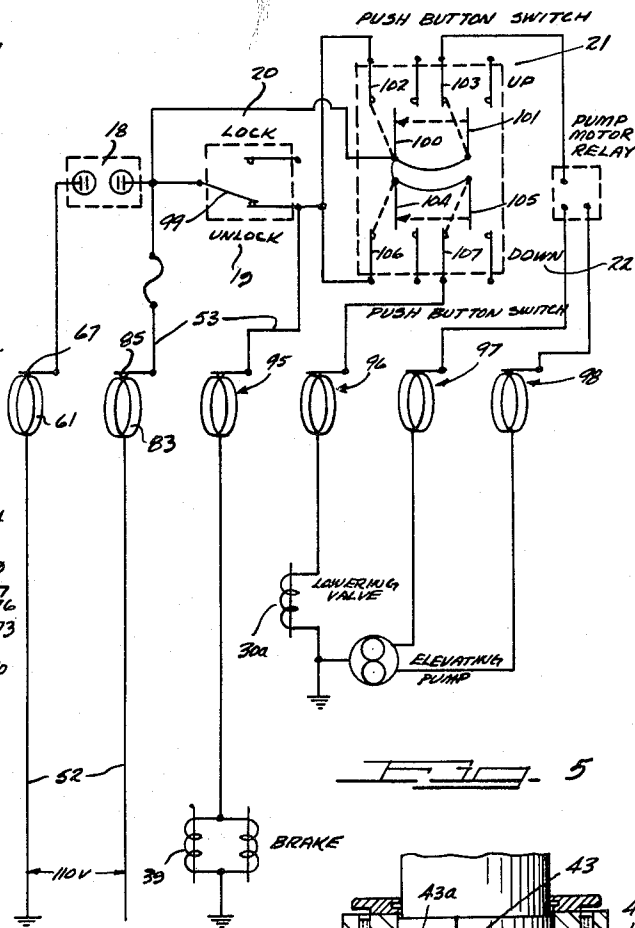
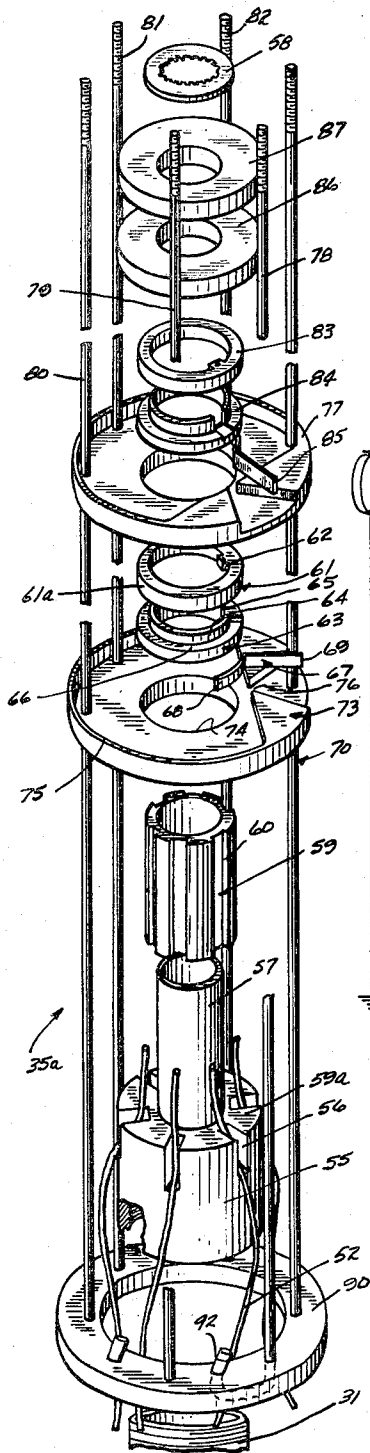
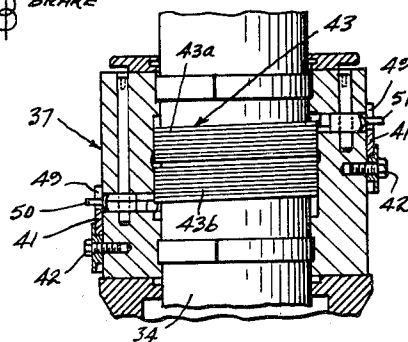


FIG. 5



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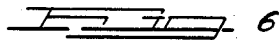
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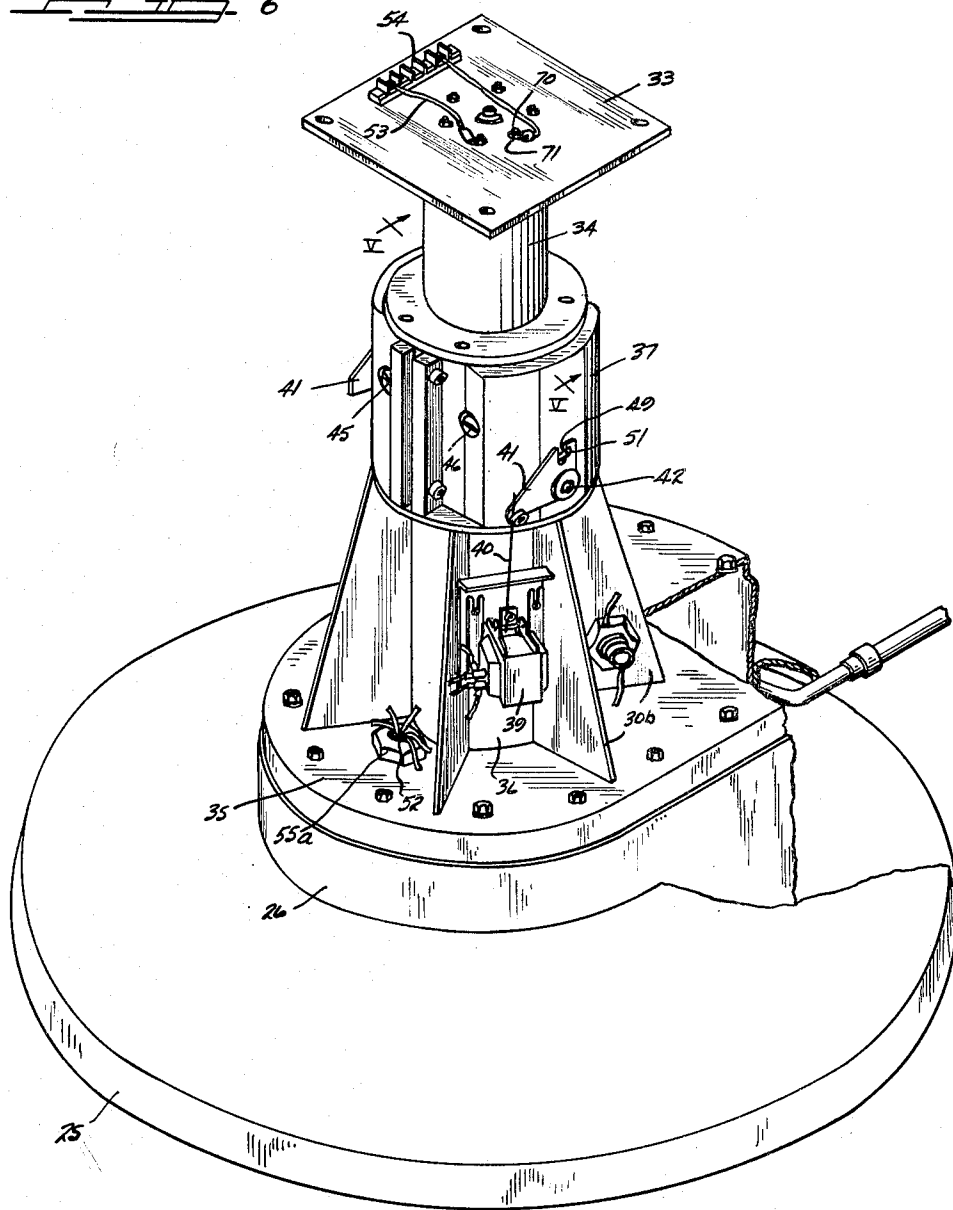
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BARBER CHAIR WITH ELECTRICAL OPERATION

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Filed Aug. 30, 1961, Ser. No. 135,062

10 Claims. (Cl. 248-404)

The present invention relates to an improved elevatable and rotatable chair wherein the chair is power operated and power controlled and electrical control circuits and power circuits extend from the base to the chair top so that the operations of lifting, lowering, and locking can be conveniently performed by electric push buttons.

The invention particularly pertains to a chair which is electrohydraulically operated wherein the chair is elevated by a hydraulic mechanism driven by a pump operated by an electrical motor, and the chair is lowered by an electrical valve for releasing the hydraulic fluid. The chair is locked or unlocked against rotation by an electrically controlled braking mechanism.

In power operated chairs which can be elevated and lowered and rotated, such as the chairs for barbering, it is desirable that the power operated functions of the chair be controllable from a point of easy access. In accordance with the present invention the chair is provided with one or more control panels mounted on the chair such as on the arm or back so that the operator can control the functions of the chair quickly and easily without changing positions, without having to lay down his tools or instruments, without having to resort to relatively heavy manual labor for pumping up the chair, and without having to soil his hands. Since the controls rotate with the chair they will be readily accessible and quickly locatable by the operator who is usually oriented with respect to the chair or its occupant rather than to the base of the chair, and the difficulties of quickly and easily locating the position of a control on a chair base are obviated. Further, the present invention provides for improved circuit arrangements wherein the circuit constructions accommodate both power and control circuitry so that in a barber chair for example, power is available for electric clippers, vibrators and similar accessories without having to turn to wall outlets or other inconvenient power sources.

Accordingly, an object of the present invention is to provide an improved power chair construction with a circuit mechanism conveniently incorporated therein which does not interfere with functions of the chair, wherein the circuit mechanism is protected and housed by the operating mechanism of the chair, and wherein multiple circuits conveniently provide both control and power functions.

A further object of the invention is to provide a power operated rotatable and elevatable chair construction wherein a large number of electrical circuits are provided from the base to the chair top and wherein mechanism is provided for the circuits to accommodate both the rotation and elevation of the chair without interference of the electrical circuitry.

A still further object of the invention is to provide an improved circuit arrangement accommodating both rotation and elevation of a chair wherein the mechanism accommodating these movements is contained within unusually compact space and provides for a large number of both power and control circuits and also accommodates adding to the number of circuits without change in basic structure.

A still further and important object of the invention is the provision of an elevatable and rotatable chair such

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as used in barbering wherein control and power circuits lead from the base of the chair to the top of the chair and are compact and yet capable of the extremely long operating life so as to be usable in the field for lifetime operating conditions without attention.

Other objects, advantages and features will become more apparent with the teaching of the principles of the invention in connection with the disclosure of the preferred embodiment thereof in the specification, claims and drawings, in which:

FIGURE 1 is a side elevational view of a power operated chair of the type embodying the principles of the present invention;

FIGURE 2 is a vertical sectional view of a fragmentary portion of the base of the chair;

FIGURE 3 is a detailed perspective view of electrical circuit mechanism for accommodating elevation and rotation of the chair, and showing the upper portion of the mechanism in exploded form;

FIGURE 4 is a wiring diagram showing parts in schematic form, of the circuitry of the invention;

FIGURE 5 is a vertical fragmental sectional view taken substantially along line V-V of FIGURE 6; and

FIGURE 6 is a perspective view showing the base and a portion of the chair frame, with parts removed for clarity.

As shown on the drawings:

FIGURE 1 shows a typical type chair for use with the present invention, illustrating a barber chair with a supporting base 10 for resting on a floor surface, with an enclosing shroud 11 above the base, and a chair 12 having a seat 13, a footrest 14, a back 15 and armrest 16.

A control and power panel 17 is shown mounted on the armrest 16, although it will be understood that this may be provided in any convenient place on the chair such as on the back or the other arm, and additional panels may be provided, some with outlets and some with switches or with both. The panel 17 is shown with an electrical outlet 18, with push button brake control switches 19 and 20, and push button raising and lowering switches 21 and 22, and the corresponding location of these switches in the circuit diagram is shown in FIGURE 4.

The chair base incorporates elements including a formed or shaped metal lower base member 25 upon which rests a base housing member 26, as shown in FIGURES 2 and 6. Upon the base housing member is mounted the shroud 11 which extends upwardly to cover the structure which is shown exposed in FIGURE 6, inasmuch as the shroud 11 is omitted from that figure for clarity.

The base housing is turned upwardly at its upper portion in a horizontal flat platform 35, and suspended from the platform is a hydraulic fluid tank 24 supported on the platform by bolts 28. Bolts 27 also extend through the platform to secure to the lower base member 25.

Within the hydraulic fluid tank 24 is mounted a motor and pump, which is omitted from FIGURE 2 for clarity, but is shown by the caption Elevating Pump in FIGURE 4. The pump delivers fluid to a conduit 29 to a cylinder supporting base 30 which has a chair elevating cylinder 31 extending upwardly therefrom. Within the cylinder 31 is a piston, not shown, attached to a piston rod 32 and the upper end of the piston rod is secured to a chair frame member 33 which is part of the chair frame for supporting the chair 12 in FIGURE 1. For convenience of description, the entire lower stationary support structure including the elements supported in the tank 24 such as the cylinder base 30 and the cylinder 31 may be regarded as the base of the chair particularly inasmuch as they remain stationary. Similarly, the plate or frame member 33 may be referred to conveniently as the frame

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of the chair since it is a part thereof and rotates with the chair 12. It will of course be understood that the chair is supported on the plate 33 by the parts being suitably attached or bolted thereto, and FIGURE 6 illustrates the plate 33 as being provided with holes for that purpose.

The chair is elevated by the piston rod 32 pushing upwardly on the chair frame plate 33 as caused by the delivery of hydraulic fluid through the conduit 29 to the base of the cylinder. The elevating pump is electrically operated so that the chair will be raised when the motor of the pump is operated. The chair is lowered by opening a release valve 30a which connects to the cylinder base member 30 and opens into the base of the cylinder 31, and the release valve is also electrically operated. In the control circuitry, as will be described, the Elevating Pump and the release or dump valve 30a will be selectively controlled from the chair by operation of the switches 21 and 22.

The chair is supported in a lateral or radial direction by a chair lift cylinder or lift tube 34 which is secured to the frame plate 33 at its upper end, and is held by bearings within a bearing housing 37, FIGURE 6. The lift tube 34 forms the sole lateral support for the chair, and also functions as a housing for electrical circuit mechanism 35a, FIGURE 2, which is compactly enclosed within the lift tube 34.

For supporting the bearing housing 37, it is provided with a lower tubular portion 36 which is secured at its lower end to the platform 35 of the base housing 26. The tubular part 36 of the bearing housing may be suitably secured to the platform 35 such as by welding and be reinforced by radial fins 30b, or other suitable support means may be provided such as by having an outwardly extending flange at the lower end thereof bolted to the platform 35.

The bearing housing 37 also encloses a brake 43 which is electrically operated and may take various forms. One preferred form of brake mechanism is shown comprised of an upper wound coil brake band 43a and a lower wound coil brake band 43b with the brake bands wound in opposite directions. The bands have a normal diameter smaller than the lift tube 34 and therefore each one tends to wind tightly around the lift tube and grip it in the direction in which the band is wound. One end of each of the bands is anchored such as at 45 and 46 in the bearing housing by being clamped between knurled holding lugs which are held together by vertical set screws, not shown.

The bands are released through the action of solenoids 39 having plungers which are connected to short cables 40 secured to the ends of brake release pivotal plates 41, pivoted at 42 on the sides of the bearing housing, FIGURES 5 and 6.

The plates 41 have upper slots 49 receiving the outer ends of brake release pawls 50 and 51 which respectively engage the free ends of the brake bands 43a and 43b to release the brakes when the pawls are pivoted due to actuation of the solenoids. When the solenoids are deenergized, the natural resiliency of the brake bands causes them to grip the lift tube 34. The solenoid is energized or deenergized through actuation of the control switch as exemplified by the push button switches 19 and 20. It will of course be understood that other forms of electrically operated brake mechanisms may be operated through the control circuitry shown and described.

Electrical power is brought into the base of the chair through leads 52, FIGURES 2, 4 and 6. The leads may be conveniently brought into a sealing fitting 55a in the platform 35 and extend down into the hydraulic fluid tank 24 and be laced up along the cylinder 31. Any convenient form of lacing may be employed and the wires or leads 52 may be merely conveniently tied to the cylinder 31. The leads pass into the mechanism 35a which accommodates rotational and elevational movement of the chair, and at the top of the chair frame plate 33 leads

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53 connect to a bus bar 54 from which leads are taken to the control switches and to the power outlet 18. The conductor mechanism 35a is supported at the top of the cylinder 31 which is threaded for that purpose. A hollow threaded shaped cylinder 55, FIGURE 3, is screwed tightly onto the top of the cylinder 31. The cylinder 55 is preferably of an insulative material and is provided with slots 56 at its upper end for receiving the wires 52. Integral with the cylinder 55 is an upwardly extending tube 57, which receives at its upper end a locking ring 58, FIGURES 2 and 3, for holding the assembly together.

Mounted on the tube 57 is a sleeve 59 which rests on an upper shoulder or surface 59a on the cylinder 55, and is locked to the tube 57 such as by being cemented thereto. The tube is preferably of insulative material and is provided with vertical grooves or channels 60 which carry the wires 52, and also lock conductor rings against rotation, as will be described.

The circuit is formed through the mechanism 35 to accommodate rotation and elevation of the chair, by first conductor elements or rings 61 having outer annular conductor surfaces 61a, and second conductor elements or brushes 67 in engagement with the annular surfaces 61a of the first elements. The brushes are also in vertical sliding engagement with conductor rods such as 70 which vertically reciprocate with the chair. The rings 61 are stationary with respect to the base 10, while the brushes 67 rotate with the chair 12.

The structure in greater detail incorporates an inwardly extending lug 62 on the ring 61 which may be provided with a small opening or otherwise serve as a terminal for connection of a lead 52. This lug is also received by a groove 60 in the sleeve 59 so as to hold the ring 61 against rotation, and the upper end of the wire 52 will be cleaned of its covering and projected into the opening in the lug 62 and soldered otherwise suitably connected thereto for conducting electrical current. The conductor ring 61 rests on an insulating ring 63 which has an inner upwardly extending flange 64 to center the conductor ring 61, and the flange is provided with a notch 65 for receiving the lug 62, and a shoulder 66 on the insulator ring supports the conductor ring 61. The insulator ring 63 rests on the shoulder 59a of the cylinder 55, and successive insulator rings rest on top of each other with a ring 84 resting on top of the insulator ring 63.

Each of the successive stacked assemblies which incorporate the conductor ring 61, the insulator ring 63, the brush 67, and a brush supporting plate 73 are of identical construction and therefore only one need be described in detail. It is to be noted that these are flat and compact and by being of identical construction lend themselves to inexpensive manufacture and interchangeability of parts.

The brush 67 is in the form of a resilient spring finger formed in the general V-shape with an inner end 68 which rides on the conductor surface 61a of the conductor ring 61, and an outer end 69 which slidably rides on the rod 70. The brush is supported on the plate 73, which has a central opening 74 for receiving the insulator ring 63 and has a raised outer flange edge 75 for supporting a plate 77 above it. The raised outer edge 75 is widened adjacent the conductor rod 70 which passes through an opening through the plate, but has a radially extending V-shaped relieved portion with a small opening 76 for pivotally receiving the brush 67 and supporting it so that its ends will resiliently bear with contact pressure against the rod 70 and the conductor ring 61.

The plate 73 is of an insulative material and rotates with the chair since the vertical conductor rods 70, 78, 79, 80, 81 and 82 pass through vertical openings there-through. Thus the brush 67 which is mounted thereon is carried around with the chair to rotate relative to the conductor ring 61. In an example construction, this mechanism has been found to provide exceeding good wear char-

acteristics in a life test, and to be capable of substantially lifetime use in a mechanism such as a barber chair.

Above the plate 73 is the plate 77 which supports a brush 85 for another circuit, and the brush 85 engages a stationary conductor ring 83 which is supported on the insulator ring 84. Similar compact assemblies of brushes and conductor rings with their supporting mechanism may be stacked up above the cylinder 31 to provide an almost infinite number of circuits leading to the top of the barber chair, and yet the mechanism is completely protected and is compactly held requiring substantially no more space than for a chair not provided with electrical circuitry.

Spacer rings 86 and 87 may be positioned above the conductor assemblies for being later removed in the event additional circuits are to be added, or for using standard mechanism and producing chairs with different numbers of circuits. The construction of FIGURE 2 shows two additional circuit assemblies within the plates 88 and 89, and these have been omitted for clarity from FIGURE 3.

The vertical conductor rods such as 70 are threaded at their upper ends for receiving nuts 71 which are drawn tightly against the frame plate 33. The frame plate 33 may be constructed of an insulative material, or may be drilled with enlarged holes with insulating sleeves dropped into the holes surrounding the upper ends of the rods 71. The threaded rods provide convenient terminals for attachment of the leads 53, as shown in FIGURE 6.

The rods serve a dual function and aid in holding the parts together, and at their lower ends extend through openings in an annular insulating ring 90 which is set up within the bottom of the lift tube against a shoulder 91 therein. The rods are formed into a general U-shape at their lower ends 92 with the end of the rod projected up through another hole in the ring 90, in the manner shown in FIGURE 3, and this provides a secure anchorage at the base of the rods. The piston rod 32 may be provided with a shoulder 94 at its upper end against which the plate 33 rests and it is locked to the rod 32 by a lock ring 94a. The plate 33 is supported on the lift tube 34 and can be drawn down tightly against the upper edge of the lift tube 34 by the rods.

In the circuit diagram of FIGURE 4, an interlock arrangement is provided wherein the brake is automatically unlocked when the chair is lowered or raised. It will be understood that while FIGURE 4 illustrates a preferred arrangement for this structure, the principles embodied are intended to be sufficiently broad to cover other equivalent interlocking structures, whether mechanical or electrical, wherein control is achieved from the top of the chair and the brake is automatically released when raising or lowering.

Brake operation independent of the raising and lowering function is accomplished by the switch arm 99 moving down to the unlocked position for electrically energizing the brake solenoids 39 which will release the brake, or moving the switch arm 99 to the upper locked position which will deenergize the solenoids releasing the brake. This is illustrated as being accomplished by interlocked push button switches 19 and 20.

Lowering the chair is accomplished by the push button switch 22 which when depressed moves the switch arms 104 and 105 against the contacts 106 and 107. The contact 107 through the circuit of the slip ring and brush 96 energizes the lowering valve 30a to cause the chair to descend. Simultaneously, the switch arm 104 moving to the dotted line position against the contact 106 completes the circuit to the brake solenoid 39 to insure that the brake will be released regardless of the position of the switch arm 99.

When the push button switch 21 is operated to raise the chair, the switch arm 101 engages contact 103 to complete the circuit to the Pump Motor Relay to operate the Elevating Pump through slip rings 97 and 98. Simul-

taneously, switch arm 100 engages the contact 102, after the arms 100 and 101 move to the dotted line position, and this completes the circuit through the slip ring and brush 95 to the brake solenoid 39, again insuring that the brake will be released when the chair moves.

In operation, power is brought in through the base of the chair through wires 52, as shown in FIGURES 4 and 6, and a circuit to the top of the chair is established through slip rings 61 and 83 and brushes 67 and 85, and these may be referred to as power circuits for supplying the power outlet 18 on the chair. Control circuits are provided by slip rings 95, 96, 97 and 98, and the control circuit through the ring and brush 95 releases or applies the brake 39 through the push buttons 19 and 20. The control circuit through the slip ring and brush 96 actuates the Lowering Valve 30a by operating the push button switch 22. A control circuit for operating the Elevating Pump is established by slip rings and brushes 97 and 98 which are energized through the push button switch 21. The slip ring and brush construction is shown in detail in FIGURE 3 and each circuit includes a stationary conductor ring such as 61 resting on an insulator ring 63 and engaged by a brush 67 which rotates around the ring 61, and which slidably engages the conductor rod 70 as it moves up and down with the chair.

Thus it will be seen that we have provided an improved power elevatable and rotatable chair construction wherein improved arrangements are provided for bringing both control circuits and power circuits to the chair.

The drawings and specification present a detailed disclosure of the preferred embodiments of the invention, and it is to be understood that the invention is not limited to the specific forms disclosed, but covers all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by the invention.

We claim as our invention:

1. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base of said rotatable and elevatable chair frame including first conductor elements having annular conductor surfaces and second conductor elements in engagement with the first elements, one of said elements being rotatable and the other being non-rotatable with respect to the base with said elements connected in said circuit and supported on said base to be at a fixed elevation, and vertical conductor rods slidably connected to one of said elements and to said frame for raising and lowering with the chair.

2. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base of said rotatable and elevatable chair frame including first conductor elements having annular conductor surfaces and second conductor elements in engagement with the first elements, one of said elements being rotatable and the other being non-rotatable with respect to the base with said elements connected in said circuit and supported on said base to be at a fixed elevation, and vertical conductor rods slidably engaging said second conductor elements and connected to said frame for raising and lowering with a chair.

3. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base to said rotatable and elevatable chair frame including first conductor elements having annular conductor surfaces and second conductor elements being rotatable with the frame around said first elements and being in engagement with

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the surfaces of the first elements, said first elements supported on said base to be at a fixed elevation, and vertical conductor rods slidably connected to one of said elements and to said frame for raising and lowering with the chair.

4. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, first means for providing an electrical power circuit from the base to said rotatable and elevatable chair, second means for providing an electrical control circuit from the base to said rotatable and elevatable chair, said first and second means each including first conductor elements having an annular conductor surface and second conductor elements in engagement with the surfaces of the first elements, one of said elements being rotatable and the other being non-rotatable with respect to the base, first conductors leading from the rotatable element of said first means to an electrical outlet on the chair frame, and second conductors leading from the rotatable element of said second means to a control switch on the chair frame.

5. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base to said rotatable and elevatable chair frame including a plurality of vertically stacked stationary conductor ring members having annular conductor surfaces and movable conductor members engaging the surfaces of the ring members and supported for rotation with the chair frame, vertical rods in vertical sliding engagement with said conductor members and mounted to rotate with rotary movement of the chair and to slide vertically relative to the conductor members with up and down movement of the chair, electrical leads on the chair connected to the rods, and electrical leads connected to said ring members.

6. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base to said rotatable and elevatable chair frame including a plurality of vertically stacked stationary conductor ring members having annular conductor surfaces and movable resilient conductor finger members with one end slidable on said conductor surfaces, insulating spacers between said ring members, supports for said finger members rotatable with the chair, vertical rods positioned to be engaged by the other ends of said finger members and secured to the chair frame to vertically slide past the fingers and to bring the electrical circuit to the chair, and electrical leads from the base of the chair connected to said ring members.

7. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, means for providing an electrical circuit from the base to said rotatable elevatable chair frame including a plurality of vertically stacked stationary conductor ring elements having annular conductor surfaces and moveable conductor members engaging the surfaces of said ring elements and rotatable relative thereto and mounted to remain at the elevation of the ring elements to remain in contact therewith, vertical rod elements in relative vertical sliding engagement with said conductor members, one of said elements mounted on the frame to move vertically and to rotate therewith and the other element mounted on the base to remain stationary, electrical leads on the chair connected to said one element, and electrical leads on the base connected to said other element.

8. An elevatable and rotatable chair mechanism com-

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prising a base for supporting a chair, an elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, an electrically operable brake supported on the base and engageable with a member on the chair frame to lock the frame against rotation, a brake control switch on the frame, a first electrical circuit leading from the base to said switch having stationary conducting means on the base and connected rotary and elevatable conducting means on the frame accommodating rotary and elevational movement of the frame relative to the base, and a second electrical circuit leading from the switch to the brake on the base having stationary conducting means on the base and connected rotary and elevatable conducting means on the frame accommodating rotary and elevational movement of the frame relative to the base so that the brake is operable by operating the switch.

9. An elevatable and rotatable chair mechanism comprising a base for supporting a chair, an electrical power operated elevating and lowering mechanism on the base for supporting a frame for the chair accommodating rotation of the frame, and electrically operable brakes supported on the base and engageable with a member on the chair frame to lock the frame against rotation, first and second circuit means connected between the base of the chair and the frame accommodating vertical and rotary movement of the frame including first conductor elements having annular conductor surfaces and second conductor elements in engagement with the first elements, one of said elements being mounted for rotation with the frame and the other being mounted non-rotatable on the base, first conductors attached to said first circuit means and leading to an electrical lowering and elevating control switch on the chair frame and to said power operated elevating and lowering mechanism, and second conductors attached to said second circuit means and connected to said electrically operated brake for controlling the brake from the chair frame.

10. In an elevatable and rotatable chair mechanism including a base structure and a chair frame structure and means between said structure elevatably and rotatably connecting them,

said means including elevating structure, means providing electrical control circuitry from said base to said frame including

first conductor elements having annular conductor surfaces

and second conductor elements in electrical engagement with the first elements,

one of said elements being rotatable and the other being non-rotatable with respect to the base and with said elements connected in said circuitry and supported on said base to be at a fixed elevation,

vertical conductor rods connected to the chair frame and movable therewith,

and slidable conductor means connected to said rotatable elements and engaging said rods slidably and maintaining electrical connection between said rotatable elements and said rods in the raising and lowering of the chair.

References Cited by the Examiner

UNITED STATES PATENTS

1,242,109	10/17	Koken	248—418 X
1,242,110	10/17	Koken	248—418 X
1,364,882	1/21	Koken	248—418 X
3,028,933	4/62	Mueller	188—77

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