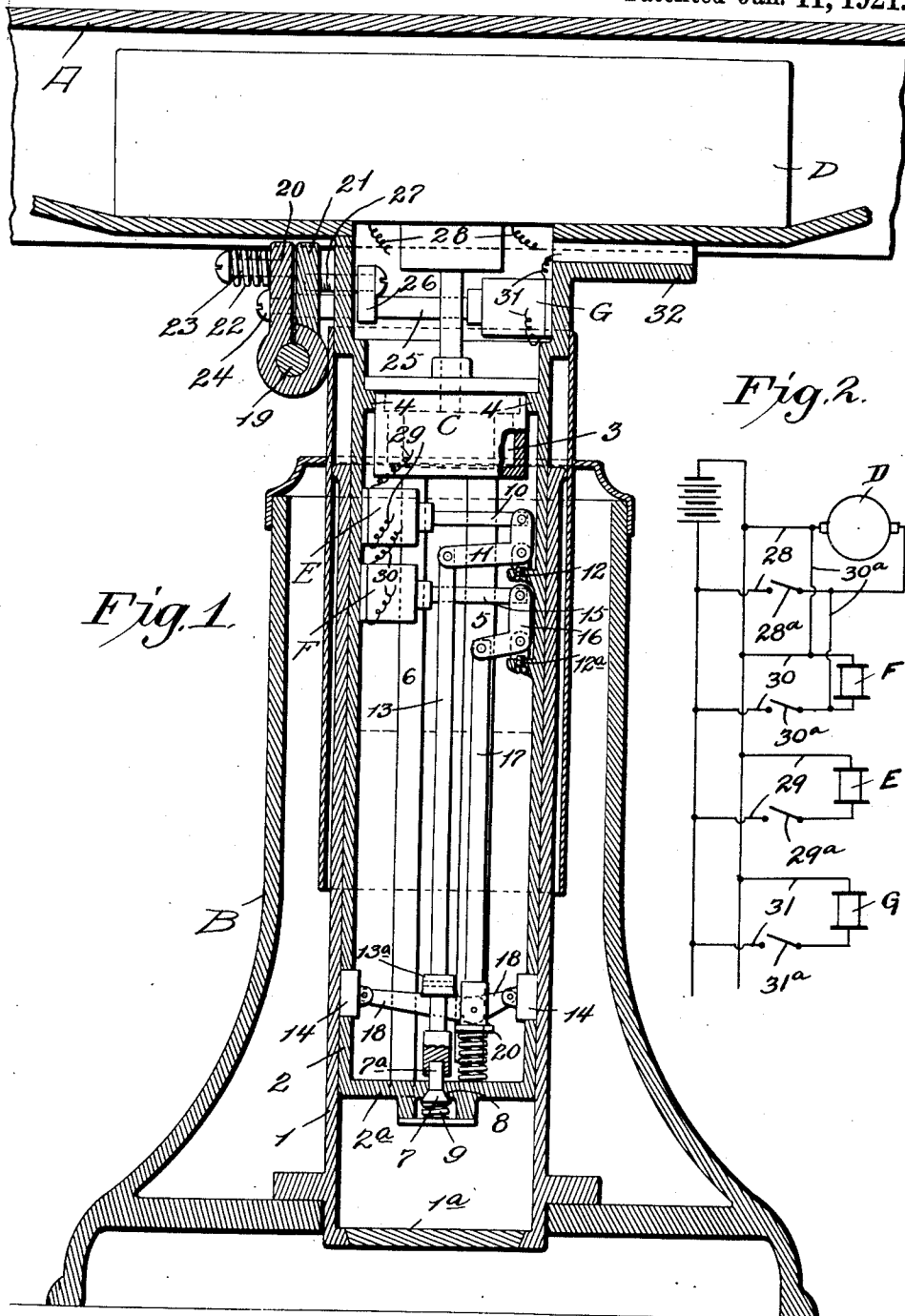


W. F. KOKEN.
 BARBER'S CHAIR.
 APPLICATION FILED DEC. 10, 1919.

1,364,882.

Patented Jan. 11, 1921.



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Specification of Letters Patent.

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Application filed December 10, 1919. Serial No. 343,852.

To all whom it may concern:

Be it known that I, WALTER F. KOKEN, a citizen of the United States, residing at St. Louis, Missouri, have invented certain new and useful Improvements in Barbers' Chairs, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to chairs of the type that are provided with a vertically-adjustable stem which carries the seat frame of the chair, such, for example, as chairs of the kind that are used by barbers, dentists and other specialists.

The main object of my present invention is to provide an electrically-operated chair of simple construction, that is easy to control, inexpensive to manufacture and not liable to get out of order when in use.

Another object is to provide an adjustable chair of the general type referred to, which is equipped with electrically-operated devices for releasing the means that hold the seat frame of the chair and the parts associated with the seat frame in adjusted position, such, for example, as the clamp that prevents the seat frame from rotating, the clamp that locks the reclining bar which governs the position of the back and the apron of the chair, and the valve that is generally used in hydraulic chairs for lowering the stem which carries the seat frame.

To this end I have devised a hydro-electric chair that is provided with an electrically-operated rotary pump for circulating a non-compressible liquid that causes the stem of the chair to move upwardly when said pump is set in operation. Any preferred means can be used for lowering the stem or for causing the stem to move downwardly and any preferred means can be used for releasing the means that holds the seat frame and the parts associated with same in adjusted position. In the chair herein illustrated electrically-operated devices are employed for opening a valve that causes the stem to descend, for releasing the clamping means that prevents the stem from rotating and for releasing the clamp that locks the reclining bar which holds the back and the apron of the chair in adjusted position. I wish it to be understood however, that it is immaterial, so far as my broad idea is concerned, whether manually operable devices or electrically-operated devices are

used for actuating the lowering valve and the various clamping devices previously referred to, as the principal feature of my present invention consists in the means employed for raising the stem of the chair.

Figure 1 of the drawings is a vertical sectional view of the standard of a chair constructed in accordance with my invention, and Fig. 2 is a diagrammatic view, illustrating the wiring of the chair.

Referring to the drawings which illustrate the preferred form of my invention embodied in a barber's chair, A designates the seat frame of the chair to which the arms, the apron and the back (not shown) are connected, said back, arms and apron being joined together in such a manner that they will move simultaneously when the position of the back is changed. The standard B of the chair may be of any preferred design and is provided with a vertically-disposed socket 1 that receives a vertically-adjustable stem 2 which carries the seat frame A of the chair. The stem 2 is hollow and is provided at its lower end with a head or end wall 2^a that is disposed oppositely to the end wall 1^a of the socket 1. Said socket and stem contain a non-compressible liquid, preferably oil, and an electrically-operated rotary pump C of any preferred type is employed for forcing said liquid out of the stem and into the space between the lower end of the stem and the bottom 1^a of the socket 1, so as to cause the stem to move upwardly in said socket 1.

In the chair herein illustrated the pump C consists of a horizontally-disposed cylinder provided with an eccentric chamber in which a rotor 3 is arranged, as shown in broken lines in the drawing, said rotor being equipped with a plurality of spring-pressed, radially-disposed blades that bear against the inner surface of the eccentric chamber in the cylinder of the pump. The rotary pump C is driven by an electric motor D of any preferred type that can be connected to the rotor of the pump either directly or through a suitable gearing. I prefer to use a slow speed electric motor for operating the pump C and arrange said motor horizontally upon the upper end of the stem 2 or within the seat frame A of the chair, as shown in the drawing, the pump C being arranged inside of the stem 2 and supported by a flange 4 on said stem. The pump C is provided with an inlet pipe 5

whose lower end terminates within the stem 2 above the end wall of same and a discharge pipe 6 whose lower end projects downwardly through the end wall 2^a of the stem or communicates with a port in said end wall. When the pump C is set in operation the liquid in the stem 2 will be drawn into the pump through the inlet pipe 5 and then forced out of the pump through the discharge pipe 6 into the space between the lower end of the stem 2 and the bottom of the socket 1, thus causing the stem to move upwardly.

Downward movement of the stem 2 is effected by opening a valve 7 so as to permit the liquid in the space between the lower end of the stem and the bottom of the socket to pass upwardly into the stem through a port 8 in the end wall 2^a of the stem in which the valve 7 is normally held seated by means of a spring 9 that exerts upward pressure on same. The valve 7, which I will hereinafter refer to as the lowering valve, can be operated in various ways, but I prefer to equip the chair with an electrically-operated device for opening said valve or moving it downwardly so as to open the port 8 in the end wall of the stem. The device herein illustrated for opening the valve 7 consists of a solenoid E arranged on the inside of the stem 2 adjacent the upper end of same and having its core connected by a link 10 to one arm of a bell crank lever 11 arranged inside of the stem and pivotally mounted on a bracket 12 on the stem, the other arm of said bell crank lever being connected to a rod 13 provided at its lower end with a socket that receives the stem 7^a of the valve 7. When the solenoid E is energized the rod 13 moves downwardly and unseats the valve 7, thereby permitting the liquid which sustains the stem 2 to circulate upwardly through the port 8 in the lower end of said stem, and consequently, causing the stem to move downwardly.

Means is provided for preventing the stem 2 and the seat frame A carried by same from rotating, the means herein illustrated for this purpose consisting of a pair of segmental shaped shoes 14 slidably mounted in guideways in the stem and adapted to be forced outwardly into snug engagement with the inner wall of the socket 1. Various means may be used for actuating said clamping shoes 14, but I prefer to equip the chair with an electrically-operated device, preferably a solenoid F whose core is connected by means of a link 15 to a bell crank lever 16 whose other arm is connected by means of a rod 17 with a pair of toggle links 18 that are joined to the clamping shoes 14, said lever 16 being pivotally connected to a bracket 12^a on the interior of the stem. A coiled expansion spring 19 that is inter-

posed between the bottom of the stem 2 and a collar 20 to which the toggle links 18 are connected exerts pressure on said toggle links in a direction tending to straighten them, and thus force the clamping shoes 14 outwardly into snug engagement with the inner side of the socket 1. When the solenoid F is energized the rod 17 moves downwardly, thus breaking the toggle formed by the links 18 and causing the clamping shoes 14 to be withdrawn from clamping engagement with the socket 1. In order to overcome the necessity of the operator actuating a device to energize the solenoid F that governs the clamping shoes 14 each time the lowering valve 7 is unseated, I have provided the rod 13 with a collar 13^a which is so arranged that when said rod moves downwardly to unseat the lowering valve 7 the collar 13^a on said rod will cooperate with one of the toggle links 18 to withdraw the clamping shoes 14 from engagement with the socket 1, thus causing said clamping shoes to be released automatically when the lowering valve 7 is unseated.

The means that is generally used in chairs of this general type for holding the back, arms and apron in adjusted position consists of a bar 19, commonly termed a reclining bar, that is normally locked by a spring-pressed clamp through which the reclining bar passes. In the chair herein shown the clamp that locks the reclining bar 19 is composed of two jaws 20 and 21 pivotally connected together and held tightly against the bar 19 by springs 22 arranged between the jaw 20 and the heads of laterally-projecting studs 23 on the jaw 21 that pass through holes in the jaw 20. Said clamp is pivotally connected to the upper end portion of the stem 2 by a stud 24 connected to the jaw 20 and projecting through a hole in the jaw 21, as shown in the drawing. The jaws of said clamp are separated to release the reclining bar 19 by energizing a solenoid G on the inside of the stem 2, whose core is connected to a rod 25 provided with an arm 26 that is connected by means of a screw 27 with the jaw 21 of the clamp, said screw 27 passing through an arc shaped slot in the upper end portion of the stem 2. When the solenoid G is deenergized the springs 22 move the jaws 20 and 21 into snug engagement with the reclining bar 19, thus securely holding the back, arms and apron of the chair in adjusted position.

The supply wires 28, 29, 30 and 31 that connect the motor D and the solenoids E, F and G, respectively, with the energizing circuit are preferably led from a suitable controlling means into the stem 2 of the chair through a tubular member 32 at the upper end of the stem. In Fig. 2 of the drawings which is a diagrammatic view illustrating the wiring, it will be noted that the wires 28,

29, 30 and 31 lead to separate controlling devices 28^a, 29^a, 30^a and 31^a. Also that the motor circuit 28 is connected with the circuit 30 of the solenoid F by branches 30^a in such a manner that the solenoid F will be energized whenever the controlling device 28^a is actuated to close the motor circuit. Such a control is desirable in that it causes the clamping shoes 14 to be released simultaneously with the starting of the motor by the operation of a single controlling device, namely, the device 28^a, and it also permits the clamping shoes 14 to be released when the motor is at rest by operating the controlling device 30^a.

A chair of the construction above described is easy to control, it is inexpensive to manufacture and it is of such simple design that it is not liable to get out of order when it is in use.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A hydro-electric chair provided with a vertically-adjustable stem, and an electrically-operated rotary pump for circulating the liquid used to raise the stem of the chair.

2. A chair of the class described provided with a vertically-adjustable stem, a hydraulic means comprising a rotary pump for raising the stem of the chair, and an electric motor for driving said pump.

3. A chair of the type described, comprising a vertically-adjustable stem or piston that carries the seat frame of the chair, a socket or cylinder in which said stem reciprocates, and an electrically-operated rotary pump for forcing a non-compressible liquid into the space between the end of said stem and the bottom of said socket so as to raise the stem.

4. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket, said stem being adapted to hold a supply of liquid, and an electrically-operated rotary pump for forcing liquid from said stem into the space between the end of said stem and the bottom of said socket so as to raise the stem.

5. A chair of the type described, comprising a socket, a vertically-adjustable stem in said socket, said stem being adapted to hold a liquid, a rotary pump having an inlet pipe whose end terminates inside of said stem and a discharge pipe whose end terminates below or in the lower end of said stem, and means for actuating said pump so as to cause liquid to be forced from said stem into the space between the stem and the bottom of the socket, thereby causing the stem to move upwardly.

6. A chair of the type described, comprising a vertically-adjustable stem, an electrically-operated rotary pump for causing a hydraulic medium to act on said stem and

move it upwardly, and a valve for relieving the pressure that said hydraulic medium exerts on said stem so as to permit the stem to move downwardly.

7. A chair of the type described provided with a vertically-adjustable stem, a hydro-electric means for raising said stem, and an electrically-operated means for effecting the downward movement of said stem.

8. A chair of the type described provided with a vertically-adjustable stem, a socket in which said stem reciprocates, a rotary pump arranged inside of said stem for forcing a non-compressible liquid into the space between the end of the stem and the bottom of the socket so as to move the stem upwardly, and an electric motor for actuating said pump.

9. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket and adapted to contain a non-compressible liquid, a rotary pump arranged inside of said stem adjacent the upper end of same and provided with an inlet pipe that terminates within the stem and a discharge pipe that terminates below the lower end of the stem for causing liquid to be forced out of the stem into the space between the end of the stem and the bottom of the socket, and an electric motor arranged above said pump for driving same.

10. A chair of the type described provided with a vertically-adjustable stem, an electrically-operated rotary pump for causing a hydraulic medium to act on the stem and move it upwardly, a valve for releasing the pressure that said hydraulic medium exerts on the stem, and an electrically-operated device for opening said valve.

11. A chair of the type described, comprising a vertically-adjustable stem, a hydraulic medium that sustains said stem and moves it upwardly, a valve for relieving the pressure that said hydraulic medium exerts on the stem, and an electrically-operated device for opening said valve.

12. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket and adapted to contain a non-expansible liquid, means for forcing said liquid from said stem into the space between the lower end of the stem and the bottom of the socket so as to move the stem upwardly, a valve in the end of said stem for relieving the pressure that said hydraulic medium exerts on the stem, an electrically-operated device arranged inside of the stem above the level of the liquid in same, and a connection between said device and said valve for causing the valve to open when said electrically-operated device is energized.

13. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket and adapted

to contain a non-expansible liquid, means for forcing said liquid from said stem into the space between the lower end of the stem and the bottom of the socket so as to move
 5 the stem upwardly, a valve in the end of said stem for relieving the pressure that said hydraulic medium exerts on the stem, a solenoid arranged inside of said stem, and a
 10 system of links and levers arranged between the core of said solenoid and said valve for causing said valve to open when the solenoid is energized.

14. A chair of the type described, comprising a vertically-adjustable stem, a socket
 15 or cylinder in which said stem slides, means for preventing said stem from turning or rotating in said socket, and an electrically-operated device for actuating said means to release the stem.

20 15. A chair of the type described, comprising a vertically-adjustable stem, a hydraulic medium that governs the height of said stem, a socket in which said stem is free to turn or rotate, a seat carried by said
 25 stem, a valve for releasing the pressure that said hydraulic medium exerts on the stem so as to permit the stem to move downwardly, an electrically-operated means for opening said valve, a clamp for preventing
 30 the stem from rotating in said socket, and means for automatically rendering said clamp inoperative when said valve is opened.

16. A chair of the type described, comprising a vertically-adjustable stem, an electrically-operated rotary pump for causing a
 35 hydraulic medium to act on the stem and move it upwardly, a valve for controlling the downward movement of the stem, a device for preventing the stem from rotating,
 40 and electrically-operated means for actuating the device that prevents the stem from rotating.

17. A chair of the type described, comprising a vertically-adjustable stem, a socket
 45 in which said stem reciprocates, a rotary pump for forcing a non-compressible liquid into the space between the lower end of said stem and the bottom of said socket so as to raise the stem, an electric motor for actuating
 50 said pump, a clamping means that prevents said stem from rotating in said socket, and means whereby said clamping means

will be rendered inoperative when said motor is started.

18. A chair of the type described, comprising a vertically-adjustable stem, a socket
 55 in which said stem is free to reciprocate and rotate, a valve for governing a hydraulic medium that sustains the stem, a clamping means that prevents said stem from rotating
 60 in said socket, an electrically-operated device for opening said valve, and means for automatically rendering said clamping means inoperative when said valve is opened.

19. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket and adapted
 65 to contain a non-expansible liquid, a rotary pump arranged inside of said stem for forcing liquid out of said stem into the socket
 70 so as to raise the stem, a valve in the lower end of said stem that is adapted to be opened to permit the liquid in said socket to pass into the stem and thus cause the stem to descend, clamping shoes on said stem that
 75 cooperate with said socket to prevent the stem from rotating, an electric motor for actuating said pump, and electrically-operated devices arranged inside of the stem for tripping said valve and for releasing said
 80 clamping shoes.

20. A chair of the type described, comprising a socket, a hollow stem reciprocatingly mounted in said socket and adapted
 85 to contain a non-expansible liquid, a rotary pump arranged inside of said stem for forcing liquid out of said stem into the socket
 90 so as to raise the stem, a valve in the lower end of said stem that is adapted to be opened to permit the liquid in said socket to pass into the stem and thus cause the stem to descend, clamping shoes on said stem that
 95 cooperate with said socket to prevent the stem from rotating, an electric motor for actuating said pump, electrically-operated devices arranged inside of the stem for tripping said valve and releasing said clamping
 100 shoes, means whereby the operation of opening said valve causes said clamping shoes to be rendered inoperative, and an independent means for causing said clamping shoes to be rendered inoperative simultaneously with the starting of said motor.

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