L. SMITH.

DENTAL CHAIR.

APPLICATION FILED APR. 16, 1910.

983,780.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 1.

Fig. 1

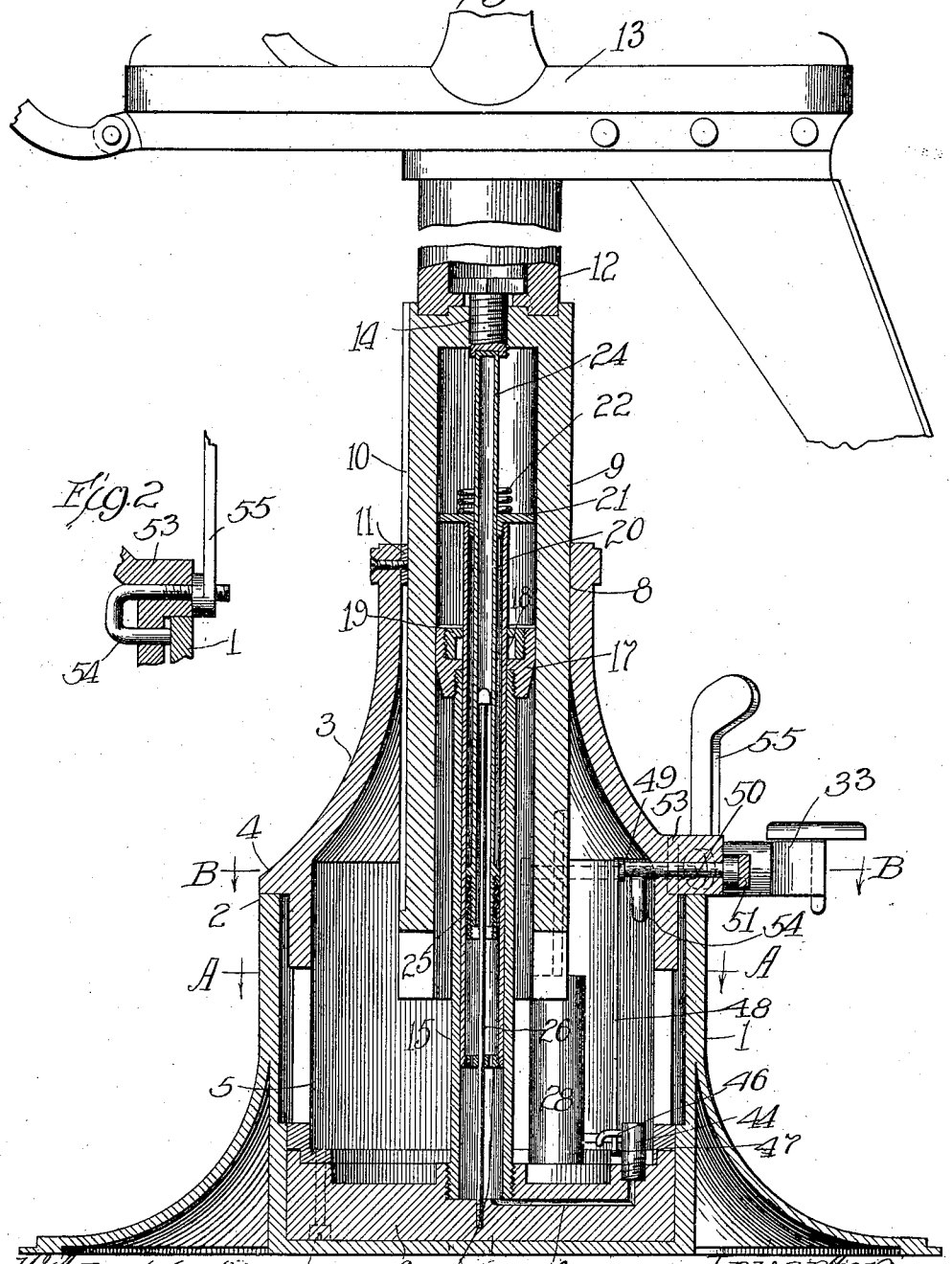


Fig. 2

Witnesses:—

R. A. White.

H. B. L. White

Inventor:

Leo Smith,

By Rummler & Rummler,

Atty's.

L. SMITH.

DENTAL CHAIR.

APPLICATION FILED APR. 16, 1910.

983,780.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 2.

Fig. 6

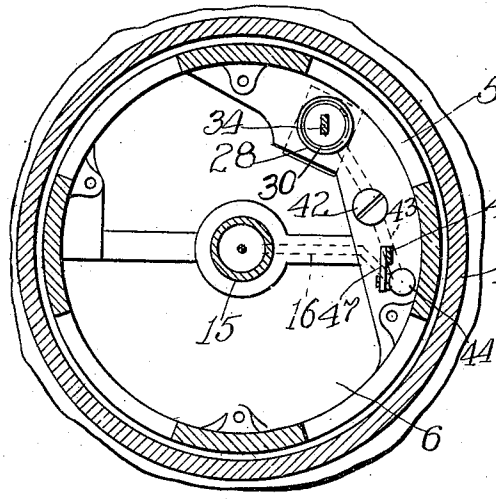


Fig. 7

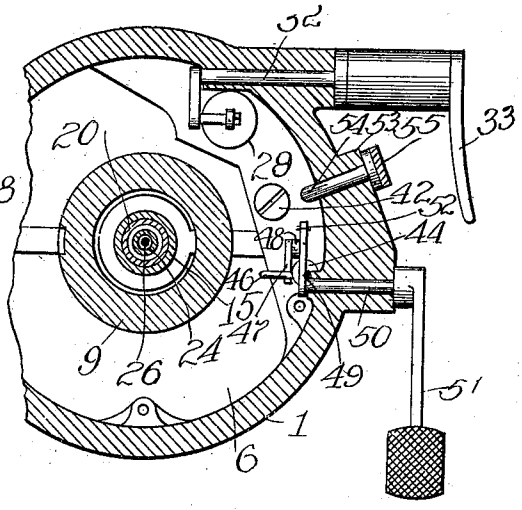


Fig. 3

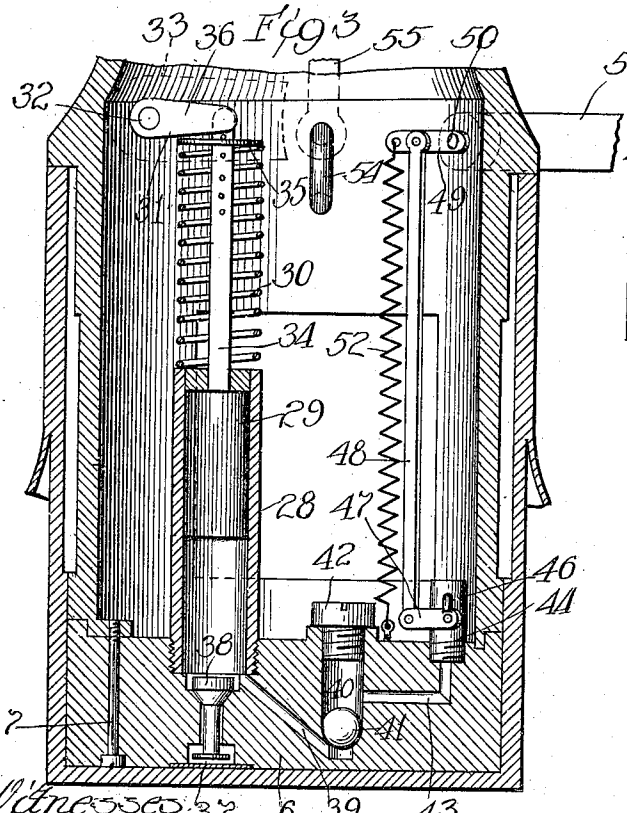


Fig. 4

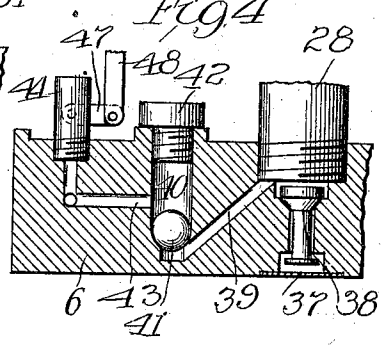
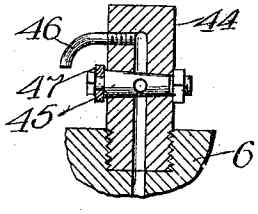


Fig. 5



Witnesses:

R. A. White.

H. C. L. White.

Inventor:

Leo Smith,

By Rummler & Rummler, Attys.

UNITED STATES PATENT OFFICE.

LEO SMITH, OF HAMMOND, INDIANA, ASSIGNOR TO FRANK S. BETZ, OF HAMMOND, INDIANA.

DENTAL CHAIR.

983,780. Specification of Letters Patent. Patented Feb. 7, 1911.

Application filed April 16, 1910. Serial No. 555,867.

To all whom it may concern:

Be it known that I, LEO SMITH, a citizen of the United States of America, and a resident of Hammond, county of Lake, State of Indiana, have invented certain new and useful Improvements in Dental Chairs, of which the following is a specification.

The main objects of the present invention are to provide an improved form of hydraulic chair wherein the elements are so constructed, and are so correlated that the chair can be raised into lifted position and there held securely, and can be lowered easily, and furthermore, can be rotated about a vertical axis or locked against rotation, as desired; to provide improved pumping mechanism for supplying the actuating fluid whereby the seat is raised to elevated position; to provide improved means for confining and for releasing the actuating fluid; to provide improved means for holding the actuating fluid under pressure when the seat is raised; and for effecting release of the fluid when the seat is to be lowered; to provide an improved form of lock or stop for preventing or limiting movement of the chair about its vertical axis.

A specific construction embodying this invention is shown in the accompanying drawings, in which:

Figure 1 is a vertical section of the operating mechanism of the chair. Fig. 2 is a detail of the stop or lock, whereby rotary motion is controlled. Fig. 3 is a section through the pump mechanism, showing a check valve for confining the actuating fluid, and also showing a rotary cock through which that fluid can be released when desired. Fig. 4 is a detail of the check valve and allied elements. Fig. 5 is a detail of the rotary cock. Fig. 6 is a sectional plan along the line A—A of Fig. 1. Fig. 7 is a similar section on the line B—B, but with certain of the parts broken away.

In the construction shown, the device comprises a fluid-tight base 1, having at its top edge an annular bearing surface 2. Within this base is a cylindrical chamber in which a rotary head 3 can be moved about a vertical axis.

The rotary head has an outstanding flange 4, seated on the top edge of base 1, and also has a slotted framework 5 extending down into the cylindrical cavity of base 1 and carrying at its lower end a bearing plate 6 secured in place by bolts 7. This bearing plate 6 is seated on the bottom wall of base 1, and contains many of the channels and conduits through which the actuating fluid is conveyed.

The upper end 8 of the rotary head 3 forms a bearing for a standard 9, which is slidingly mounted therein and can be moved up and down by fluid-actuating means.

Standard 9 has at one side a longitudinal slot 10, in which is fitted a lug 11, carried on the top of the rotary head 3. This lug serves to prevent rotary motion of the standard with respect to the rotary head. The upper end of standard 9 carries a pedestal 12, on which the chair seat 13 is mounted. A screw 14 serves to connect pedestal 12 with standard 9 and also forms a socket for the reception of one of the fluid-actuating tubes.

The fluid-operating mechanism whereby the standard 9 and its seat 12 are raised comprises a cylinder 15, screw-threaded in the center of the bearing block 6 and communicating with a channel 16 therein, through which an actuating fluid such as oil may be supplied. At its upper end, cylinder 15 carries a stuffing box 17, containing a packing 18 held in place by a gland 19.

Slidingly mounted within cylinder 15, and making a fluid-tight joint with packing 18, is an extension tube 20. This tube carries at its upper end an annular collar or stop 21, on which a stiff helical spring 22 is mounted to serve as a buffer. The lower end of the extension tube 20 carries a perforate disk 23.

Within the extension tube 20 is a piston tube 24, having its upper end seated in the screw 14 and carrying at its lower end a packing 25 adapted to maintain a fluid-tight joint between the outside of the piston tube and the inside of the extension tube 20. The piston tube 24 passes freely through the stop 21, and constitutes the element whereby the lifting force is applied to raise the chair.

Within the piston tube 24 is a rod 26 screwed into the bearing plate 6 and passing with a loose fit through a hole in the plate 23. This rod carries at its upper end an enlargement 27, serviceable to limit the upward movement of the extension tube 20 by engaging with the plate 23. The rod also serves to give rigidity to the various elements.

The pumping mechanism whereby the actuating fluid is supplied to the lower end of cylinder 15 by way of channel 16 is shown in section in Fig. 3, and in plan in Fig. 6. It comprises a pump cylinder 28 screwed into the bearing plate 6, and provided with a piston head 29 pivotally mounted on the lower end of a piston rod 30. The upper end of the rod is pivoted to a crank lever 31, and this is mounted on a rock shaft 32, which passes through the wall of the rotary head 3, as shown in Fig. 7, and carries at its outer end a manually operative lever 33, whereby the pumping operation can be effected by an operator. A helical spring 24 envelops the piston rod, and is seated on the top of cylinder 28. At its upper end, the spring bears against a stop or collar 35, made adjustable along the piston rod by a pin 36, which can be fitted in any one of a row of holes along the rod. The adjustments of this collar serve to control the tension of the spring 34.

The supply of oil for cylinder 28 comes in through the bearing plate 6 by way of a channel 37 having a check valve 38. The fluid leaves the cylinder by way of a channel 39, communicating with the lower end of a valve chamber 40, which contains a ball valve 41, and is closed at its upper end by a screw cap 42. Above the check valve 41 is a channel 43 leading to a rotary cock 44, shown in detail in Fig. 5. Channel 43 also communicates with the main lifting cylinder 15 of the device through channel 16, as shown in Fig. 6.

The rotary cock 44 is screwed into the bearing plate 6, and is provided with a rotary element 45 and a downwardly turned spout 46. Operatively connected with the rotary element 45 is a lever 47 pivoted to a long link 48, which extends up to the upper part of the rotary head 3, and is there pivoted to a crank lever 49, which is carried on a rock shaft 50, which passes through the wall of the rotary head. This shaft carries at its outer end a manually operative lever 51. A helical spring 52 connected with an extension of the crank lever 49 and also connected to the bearing plate 6 serves to hold the several parts in such position that the stop cock is normally closed, as shown in Fig. 5, thereby forcing the pumped fluid to pass through channel 16 into the lifting cylinder.

From the above description, it will be understood that the chair and its standard 9 are movable, together with the rotary head 3, about a vertical axis. To control or limit this rotary movement, the device here shown is provided with a lock or stop mounted in the rotary head near the upper edge of the base 1. This locking mechanism comprises a threaded rod 53 mounted to slide freely through a hole in the rotary head and located just above the upper edge 2 of the base. This threaded rod 53 has a hooked end 54, which passes back into frictional engagement with the inside of the base. As a means for actuating the threaded rod 53 to secure locking engagement between its hooked end and the base, there is provided a manually operative lever 55 having threads engaging with those of the rod 53. Movement of this lever draws the threaded shaft outward and brings its hooked end into locking engagement with the base. With the locking means mounted as above described, it is always in convenient position for use by the operator whether the chair be raised or lowered, and irrespective of the position of the rotary head with respect to the base.

The operation of the device shown is as follows: To raise the chair from its lowermost position, the operator works the hand lever 33, and pumps oil from cylinder 28 through channel 39 into the valve chamber 40, and then by way of channels 43 and 16 into the lifting cylinder 15, where the fluid pushes upward on the cylinder and its extension tube, and lifts the standard 9 to the elevation desired. During this operation, the turn cock 44 should be closed.

When the chair is to be lowered, the operator moves lever 51, thereby transmitting power through link 48 to crank arm 47, and thereby turning the cock and allowing the actuating fluid to escape into the main oil reservoir through the spout 46. The curvature of the spout prevents undue splashing. The helical spring 52 serves to restore the cock to closed position when the chair is low enough and the pressure on the lever 51 is removed.

If it is desired to prevent relative movement of the rotary head 3 in its supporting base 1, the lever 55 is turned on the threads of the threaded rod 53, and draws that rod outward until its hooked end 54 produces the desired frictional engagement with the upper edge 2 of the base.

Although but one specific embodiment of this invention is herein shown, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention.

I claim:

1. In a hydraulic chair comprising a base and a rotary head carried thereby, a stop for controlling relative movement of said base and head, said stop comprising a manually operative lever, and a threaded rod engaging therewith and passing into said head, said rod having a hooked end movable into holding engagement with said base.

2. A stop for limiting the rotary motion of a chair head in a chair base, said stop comprising a threaded rod seated in said head and having a hooked end adapted to

engage the inner surface of said base, and means threaded on said rod and movable thereon to force the hooked end of the rod into engagement with said base.

3. In a device of the character described, the combination of a base, a rotary head carried by said base, a seat, a standard slidingly mounted in said rotary head and supporting said seat, fluid-actuating means for lifting said standard to raise said seat, pumping mechanism for supplying an actuating fluid, said mechanism comprising a cylinder, a piston movable therein and having a pivotally connected piston rod, a lever pivoted to said piston rod, a rock shaft passing through the side of said rotary head and connected to said lever, means for confining the actuating fluid when the seat is in lifted position, a rotary stop cock for releasing said confined fluid, a lever connected to move said cock, a link pivoted thereto, means mounted on said rotary head above said base and operative to move said link, and a stop for limiting relative movement of said rotary head and base, said stop comprising a threaded rod passing through the side of said rotary head and having a hooked end movable into engagement with said base, and means for moving said rod to effect said engagement.

Signed at Hammond, this 31st day of March, 1910.

LEO SMITH.

Witnesses:
JOHN PHILLIP,
BEN BRACHIS.