No. 670,773. Patented Mar. 26, 1901.

E. M. FREDERICKS.

DENTAL CHAIR.

(Application filed Apr. 10, 1899.)

(No Model.) 2 Sheets—Sheet 1.

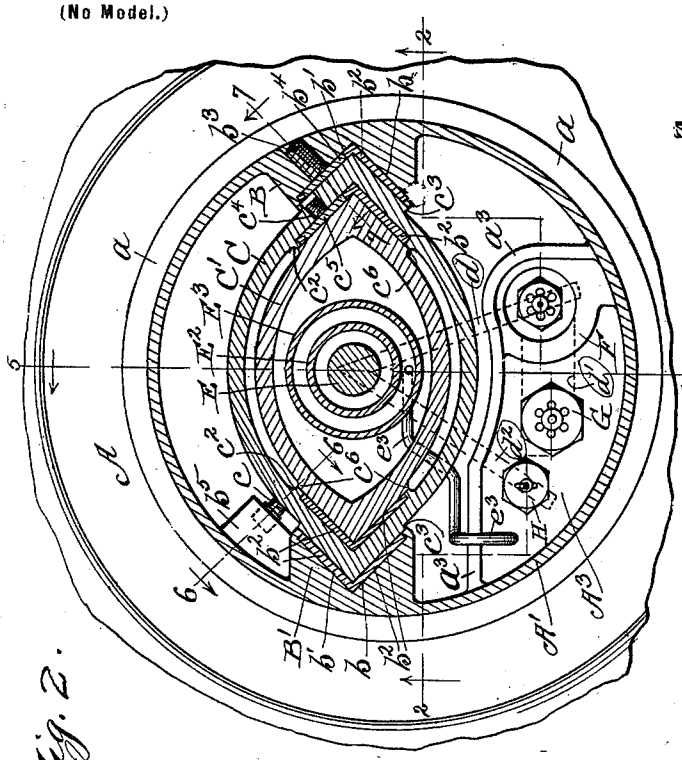


Fig. 2.

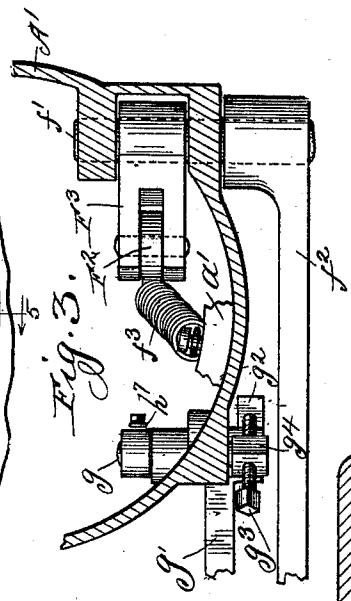


Fig. 3.

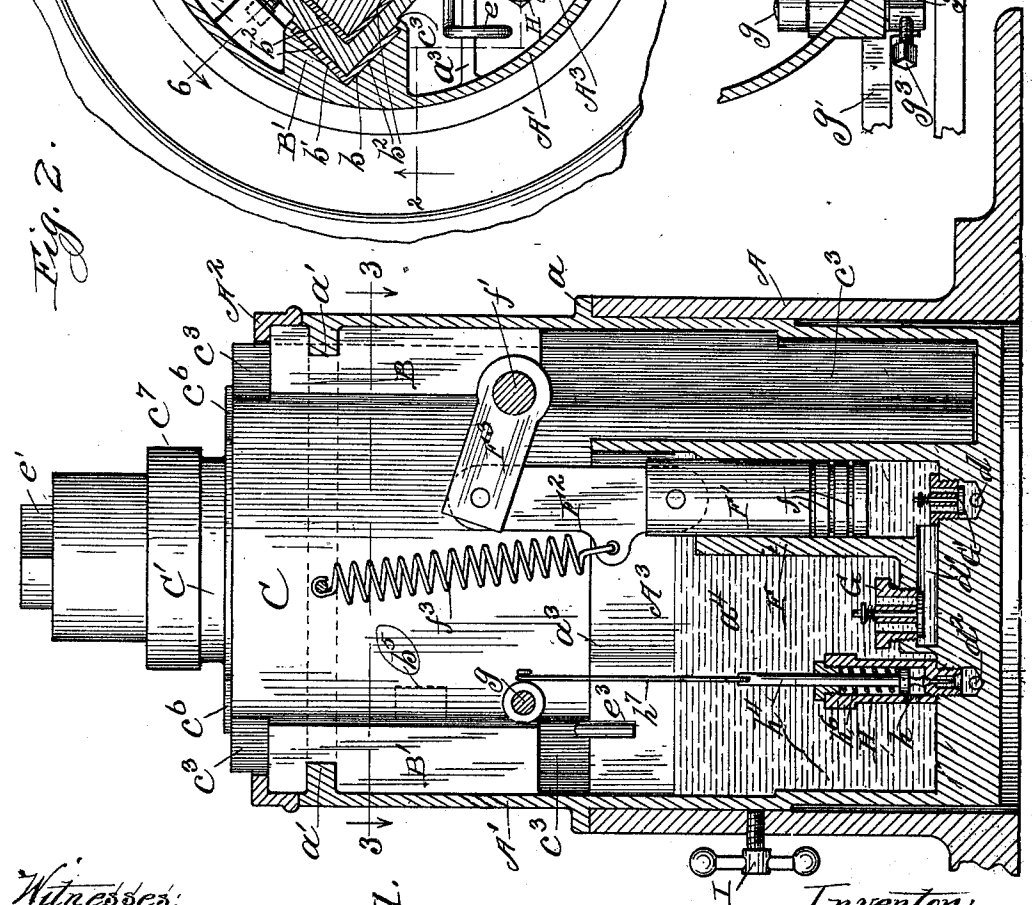


Fig. 1.

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Fig 7.

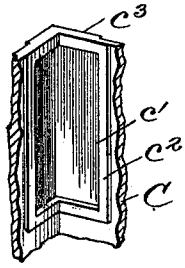


Fig. 6.

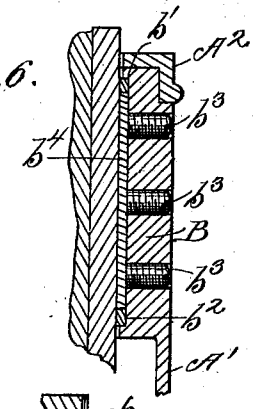


Fig. 4.

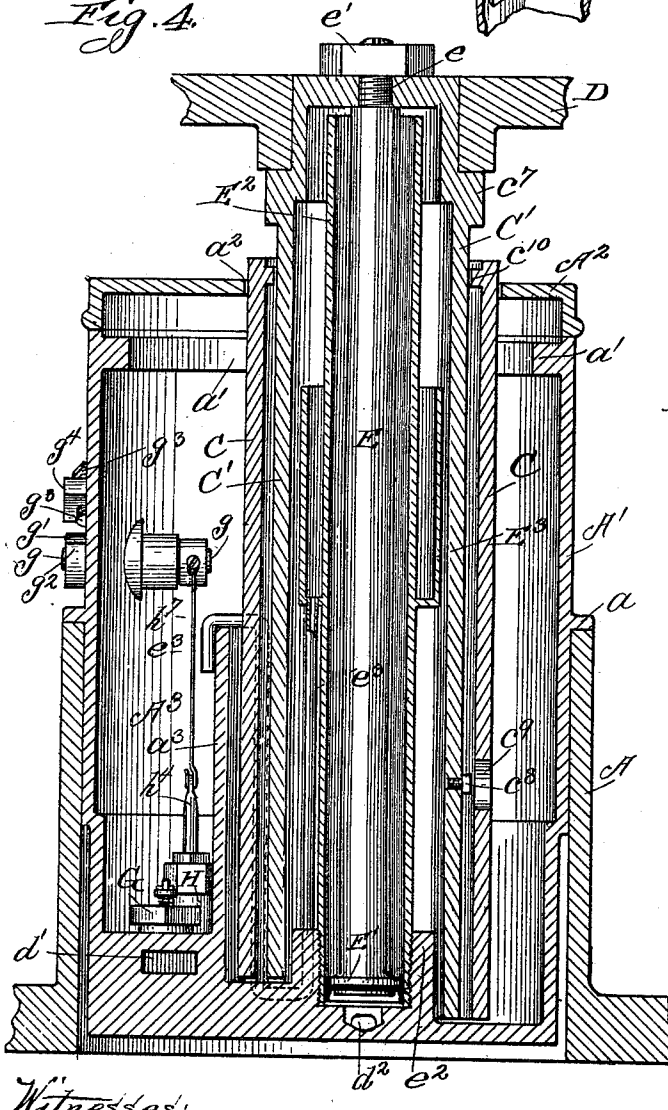
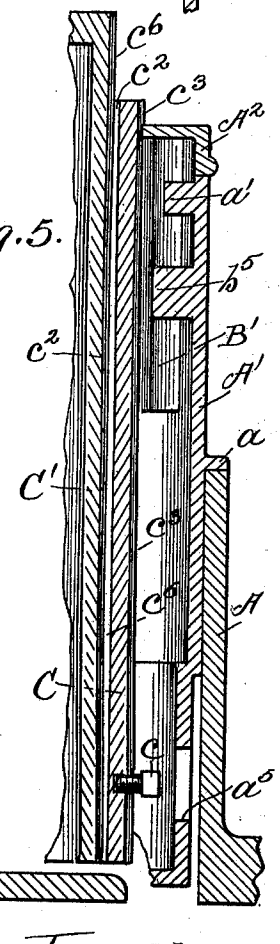


Fig. 5.



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UNITED STATES PATENT OFFICE.

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DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 670,773, dated March 26, 1901.

Application filed April 10, 1899. Serial No. 712,417. (No model.)

To all whom it may concern:

Be it known that I, ENOCH M. FREDERICKS, 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 Dental Chairs, of which the following is a specification.

This invention relates to certain improvements in that class of dental chairs in which a liquid column is employed to raise the seat or body thereof; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal object of my present invention is to provide simple and efficient means to more rigidly and firmly support the body of the chair than usual heretofore, whereby all lateral movement thereof is prevented.

Another object is to provide means for raising and lowering the seat or body that will permit of a large range of movement.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a vertical sectional view, partly in elevation, taken on the plane 2 2 of Fig. 2, showing the supporting mechanism for the chair-body. Fig. 2 is a plan sectional view taken on line 3 3 of Fig. 1 with the mechanisms for operating the pump and release-valve omitted. Fig. 3 is a similar view, partly in elevation, of a part of the lower portion of the chair, showing the mechanisms for operating the pump and release-valve. Fig. 4 is a central vertical sectional view taken on line 5 5 of Fig. 2, showing the supporting and adjusting mechanism for the chair-body. Fig. 5 is a fragmental vertical sectional view taken on line 6 6 of Fig. 2. Fig. 6 is a similar view taken on line 7 7 of Fig. 2, and Fig. 7 is a perspective view of a portion of one of the supporting-pieces or plungers of the chair-body.

Similar letters refer to like parts throughout the different views of the drawings.

A represents the base or pedestal of the chair, which, as shown in the drawings, is preferably cylindrical in form and provided with a cylindrical cavity, in which is located a portion of a revoluble cylinder A′, whose outer surface is provided about its middle with an annular flange a to rest on the upper end of the pedestal or base. The upper portion of the revoluble or supporting cylinder A′ is provided internally with an annular rib or flange a' for strengthening the same, above which is located on the said cylinder a cover A^2, having an opening a^2 for the reception and operation of one of the body-supporting pieces or plungers, as will be presently explained. Within the lower portion of the cylinder A′ is located a vertical partition a^3, which, together with the wall of said cylinder, forms a reservoir A^3 for the liquid a^4, which may be of any suitable kind. The upper portion of the supporting or revolving cylinder A′ is formed or provided on its inner surface with two enlarged portions or parts B and B′, which are located opposite each other, as is clearly shown in Fig. 2 of the drawings, and are each provided with an angular way or groove b and a similarly-shaped recess or depression b' to receive and retain a quantity of Babbitt metal b^2 or other antifriction material. The ways or grooves b are coextensive with said enlargements, and the recesses b' are simply depressions in the walls of the ways or grooves. Passing through the enlarged portion B are a series of screws b^3, whose inner ends rest against an adjusting-plate b^4, which is movably embedded in the metal b^2, located within the recess of the enlargement B, the face of which plate rests against the outer supporting-piece or plunger C of the chair-body. To one side of the enlargement B′ the revoluble cylinder is provided on its inner surface with a lug or projection b^5, against which a suitable projection c on the outer plunger C will strike when said plunger is raised to its uppermost position. The projection c is preferably a screw which engages the lower portion of the plunger C, access to which screw may be had through an opening a^5 in the lower portion of the cylinder A′ when it is desired to remove the screw c in order that the plunger C may also be removed. The plunger C, as

shown in Fig. 2 of the drawings, is substantially of an elliptic lanceolate form in cross-section and has both of its ends open and is provided at each of its apices, near its upper end, with a recess c' (see Fig. 7) to receive and retain a quantity of Babbitt or other suitable antifriction metal b^2. The recesses c' are formed in thickened or enlarged portions c^2 on the inner surface of the plunger, which extend from the upper end thereof downwardly a short distance on each side of the apices of said plunger, as is clearly shown in Figs. 2 and 7 of the drawings, in which figures it will also be seen that the outer portion of said plunger is formed with thickened parts or enlargements c^3, which extend the entire length of the plunger and on each side of the apices thereof.

Passing through the upper portion of the plunger C and extending into one of the sides of one of the recesses c thereof are a series of screws c^4, whose inner ends rest against an adjusting-plate c^5, movably embedded in the Babbitt metal b^2. Located within the plunger C is another plunger or chair-body-supporting piece C', which is substantially of an elliptic lanceolate form and has thickened or enlarged parts c^6 on its outer surface at each side of its apices, which enlargements extend from near the top of the said plunger or supporting-piece to about its bottom and form bearing-surfaces for said piece or plunger. By providing the plungers C and C' with the thickened or enlarged portions on their meeting surfaces at their apices it is apparent that the bearing-surfaces thereof are reduced to said portions, and while I have shown both plungers with enlarged or thickened portions, yet it is apparent that one only may be so formed and the same result attained. The outer enlargements or thickened portions c^3 on the outer plunger may sometimes be omitted, as is evident. The upper portion of the plunger or supporting-piece C' is provided with an annular shoulder c^7, on which may rest a casting D, to which a chair-body of the ordinary or any preferred construction may be secured and supported. The lower portion of the plunger C' is provided with a projection c^8, access to which may be had through the opening c^9 in the plunger C, and which projection is usually in the form of a screw engaging the plunger and is employed to contact with the annular flange c^{10} on the inner surface of the outer plunger, and thus prevent further upward movement of the inner plunger. Passing through the top of the plunger C' is a piston-rod E, whose upper portion is screw-threaded, as at e, to engage the screw-threaded opening in the top of the plunger and also a locking-nut e' on its upper end. While I prefer to use this means of securing the piston-rod to the plunger C', yet I may secure it in any other suitable manner. On the lower end of the rod E is a piston E', which fits closely within the cylinder E^2, whose lower end is secured to the lower portion of the revoluble cylinder A' and usually by being screwed into a boss e^2 on the bottom thereof. Surrounding the cylinder E^2, at about its middle portion, is a cup E^3, whose upper end is open to receive any of the liquid which might escape or overflow from said cylinder. To the lower portion of the cup E^3 is connected and communicates therewith a pipe e^3, which extends downwardly under the plungers, then upwardly, and discharges into the reservoir A^3, which is carried by the revoluble cylinder, and said pipe is for the purpose of conveying the liquid from the cup back into the reservoir.

Communicating with the lower portion of the cylinder E^2 is a port d, which also communicates with the pump-cylinder F, which is preferably located within the reservoir, as shown in Figs. 1 and 2 of the drawings, and has a port d' communicating with a suction-valve casing G, situated in the lower portion of the reservoir. Seated in the bottom of the pump-cylinder F is a valve G' of the ordinary or preferred construction, which controls the flow of liquid from the pump-cylinder to the cylinder E^2, or raising or lowering cylinder. Communicating with the lower portion of the cylinder E^2 through a port d^2 is a release-valve casing H, which is located in the lower portion of the revoluble cylinder and usually within the reservoir, as shown, the construction and operation of which will presently be explained in detail.

Within the pump-cylinder F is located a piston F', whose lower portion may be provided with a series of annular grooves f to receive a quantity of the liquid and to cause it to act as a packing for said piston. Pivotally secured at one of its ends to the upper end of the piston F' is a piston rod or bar F^2, whose other end is pivotally secured to an arm F^3, fixed on a shaft f', which has its bearings in the revoluble cylinder A' and is furnished at its outer end with a foot-lever f^2 to be used for operating the pump. Connected at one of its ends to the piston-rod or bar F^2 is a spring f^3, whose other end is secured to a suitable support on the revoluble cylinder, and which spring is employed to retract the piston F' of the pump.

As shown in Fig. 1 of the drawings, the release-valve consists of a casing H, which has an outlet-port h and a flaring seat for the beveled portion of the pin-valve, and is secured in a suitable opening in the bottom of the revoluble cylinder A', and, as before stated, communicates through the port d^2 with the cylinder E^2 in its lower portion. Secured on the valve-stem h^4 is a piston, between which and the upper end of the valve-casing is located a spring h^6 to normally hold the valve in a closed position. Secured at one of its ends to the upper end of the valve-stem is a rod h^7, whose other end is connected to a shaft g, having its bearings in the revo-

luble cylinder A′, and to the outer end of which is secured a foot-lever g', which is provided with a projection g^2, adapted to contact with a screw g^3, secured in a suitable lug or projection g^4, on the outer surface of the revoluble cylinder, and which screw is employed to regulate the stroke of the lever g' so as to increase or diminish the flow of liquid through the release-valve. Passing through the pedestal or base A is a set-screw I, whose inner end will impinge the outer surface of the revoluble cylinder A′ and prevent the rotary or other movement thereof when desired.

From the foregoing and by reference to the drawings it will be readily understood and seen that by operating the foot-lever f^2 the piston F′ of the pump will be forced up and down, thus causing the liquid a^4 to be drawn through the valve G and from thence through the port d' into the pump-cylinder, and from thence through the port d into the cylinder E^2, which will cause the piston-rod E located therein to rise and carry with it the plunger C′ until the projection c^3 on its lower portion strikes the flange c^{10} on the plunger C, when the latter will be raised to the desired height or until the projection c thereon strikes the lug b^5 on the revoluble cylinder, which will prevent the further upward movement of the plungers. When it is desired to lower the chair-body, the foot of the operator may be placed on the lever g', when by pressing said lever downward the release-valve will be raised or opened, thus allowing the liquid to escape from the cylinder E^2 into the reservoir. The flow of the liquid through the escape-valve may be regulated so as to lower the chair-body rapidly or slowly by setting the screw g^3, with which the projection g^2 of the lever g' contacts, at the proper point. By employing the plungers or supporting-pieces for the chair-body of the form and construction above set forth with angular bearing-surfaces it is apparent that said surfaces thereof are greatly reduced, thus reducing the amount of friction and at the same time providing a supporting means which will prevent any lateral movement of the chair-body or other movement thereof except when desired. By using the Babbitt metal or other antifriction metal b^2 in the recesses of the guideways or grooves b of the enlargements B and B′ on the cylinder A′ and in the recesses of the outer plunger it is apparent that said parts will be prevented sticking together, yet will be firmly and securely guided and held in place. Should the meeting surfaces of the two plungers and the meeting surfaces of the outer plunger and enlargements B and B′ become worn by continuous use, so as to permit of any lateral movement of the plungers, the plates b^4 and c^5 may be adjusted against the outer and inner plunger, respectively, by means of the screws b^3 and c^4, which impinge said plates, as above mentioned.

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

1. The combination of two pieces or plungers telescoping with one another and each being substantially of an elliptic lanceolate form in cross-section, with a piece having guideways for the reception and operation of the outer piece or plunger, antifriction metal located between said guideways and the bearing-surfaces of the outer plunger, a plate located in one of said guideways, and means for adjusting said plate against the outer plunger, substantially as described.

2. The combination of two pieces or plungers telescoping with each other and each having angular bearing portions, with a piece having angular guideways for the reception and operations of the bearing portions of the outer piece or plunger, and having a recess in each of its guideways antifriction material located in each of said recesses, and an adjustable plate located in one of said recesses, substantially as described.

3. The combination of two pieces or plungers telescoping with each other and each having angular bearing portions, the bearing portions of the outer plunger being provided each with a recess, with an adjustable plate located between the bearing-surfaces of the two plungers, substantially as described.

4. The combination of a cylinder having on its inner surface vertical guideways, with two pieces or plungers telescoping with one another and having angular bearing portions, the outer piece or plunger being located in the guideways of the cylinder, an adjustable plate located between the surface of one of the guideways and the surface of one of the bearing portions of the outer plunger and an adjustable plate located between the bearing-surfaces of the pieces or plungers, substantially as described.

5. The combination of a cylinder having on its inner surface vertical guideways, with two pieces or plungers telescoping with one another and having angular bearing portions, the outer piece or plunger being located in the guideways of the cylinder, an adjustable plate located between the surface of one of the guideways of the cylinder and the surface of one of the bearing portions of the outer plunger, an adjustable plate located between the bearing-surfaces of the pieces or plungers, a piston connected to the upper portion of the inner plunger and means to raise said piston, substantially as described,

6. The combination of a cylinder having on its inner surface vertical guideways, each provided with a recess, with two pieces or plungers telescoping with one another and having angular bearing portions, the outer piece or plunger being located in the guideways of the cylinder and having on the inner surface of each of its bearing portions a recess, antifriction material located in the recesses of

the guideways and of the outer plunger, an adjustable plate located between the surface of one of the guideways of the cylinder and the surface of one of the bearing portions of the outer plunger, and an adjustable plate located between the bearing-surfaces of the pieces or plungers, and means to raise said pieces or plungers, substantially as described.

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