(No Model.)

W. B. MANN.

DENTAL CHAIR.

No. 557,847. Patented Apr. 7, 1896.

Fig. 1.

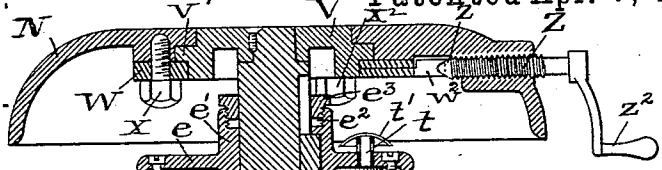


Fig. 2.

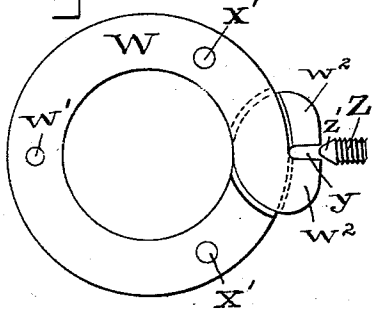


Fig. 3.

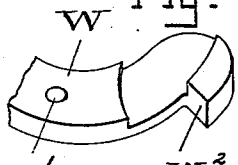


Fig. 4.

Fig. 5.

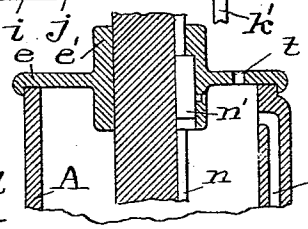


Fig. 6.

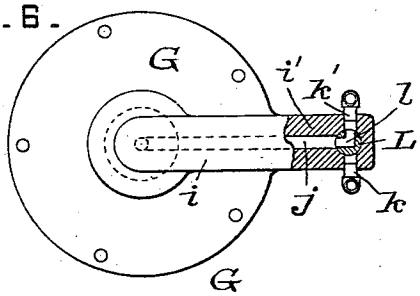


Fig. 7.

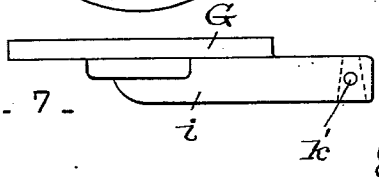
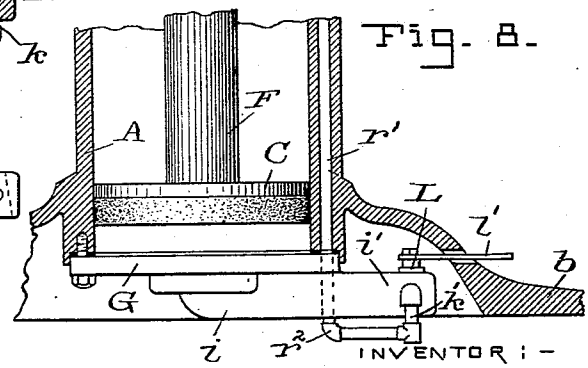


Fig. 8.



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UNITED STATES PATENT OFFICE.

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DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 557,847, dated April 7, 1896.

Application filed December 11, 1895. Serial No. 571,815. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MANN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Dental Chairs, of which the following is a specification.

This invention relates to improvements in elevating dental chairs, and has for its object to provide means in a chair of this character whereby a liquid, such as water, under pressure may be employed to elevate the chair-body without exertion on the part of the operator.

I propose to so embody my invention and combine its parts that the chair-body will be elevated by the operator actuating a valve-handle in one direction, whereupon the action of the liquid will raise the chair-body automatically, and to have the chair-body lowered by actuating said valve-handle in another direction. As, however, the use of a single valve for performing both of these functions is not essential, I may employ two independent valves, one for the admission of the liquid and the other for exhausting the liquid.

In the accompanying drawings, Figure 1 is a vertical section of the base or pedestal of a chair, a head mounted on the plunger, and the base of the chair-seat frame carried thereby. Fig. 2 is a plan view of the split friction-ring which clamps the chair-seat frame to the plunger-head. Fig. 3 is a perspective view showing one of the overlapping ends of the clamping-ring. Fig. 4 is a side view of the water-relief valve. Fig. 5 shows two views of the inverted cap on the lower end of the piston. Fig. 6 is an inverted plan view of the bottom head of the cylinder and its pipe connections. Fig. 7 is a side view of the same. Fig. 8 is a vertical section view of the chair-base, illustrating a modification, parts being broken away in order that the figure may be shown within the prescribed limits on the drawings.

Referring to the drawings, the letter A designates the base, which is cylindric and may be supported on feet or an annular rim *b*, which forms a hollow space or chamber *b'* on the floor below it. This cylinder has vertical position and contains a piston C, and plunger F, which supports the chair-seat frame. The upper end of this cylinder is closed by a head *e*, which has a collar *e'*, through which the plunger moves. This collar has at its upper end a circumferential groove e^2 around the plunger. A ring e^3 screws into the wall of the collar around the groove; but as the threaded part of the ring is of less depth than the groove a space is left below the ring in which grease or other lubricant may be placed to lubricate the plunger as the latter raises and lowers. The lower end of the cylinder is closed by a head G, which is provided with a central concavity *h* and an integral bottom part *i*, extending horizontally from a point below said concavity, and its end *i'* projecting beyond the line of the cylinder-wall into the space *b'*. This part *i i'* contains a longitudinal passage *j*, which opens at one end into the central cavity *h* and extends to the said end *i'*. This end of the passage *j* has two side branches, and supply and exhaust pipes *k k'*, respectively, connect therewith. Thus both the supply-water and the exhaust-water flow through the passage *j*. The supply-pipe *k* may lead from any source of supply—such as the water-main in cities, or a reservoir elevated on the roof of a house, or otherwise.

A three-way valve L, in the form of a key-plug having an angle-passage *l*, has a handle *l'* at one end, which projects through an opening in the rim *b* to the exterior, where it is accessible to the hand or foot of the operator. This valve has position in the end part *i'* at the intersection of the passage *j* and the two side branches which connect with the supply and exhaust pipes *k k'*, so that when the valve-plug is in one position water under pressure will pass from the supply-pipe *k* to the cylinder A to elevate the chair-body, and when the valve is in another position the liquid will exhaust from the cylinder and discharge through the pipe *k'* to lower the chair-body, as will be readily understood, and when the valve is in an intermediate position the water in the cylinder will be confined and the piston and plunger will be kept at the elevated position that may be desired. This valve therefore constitutes a three-way cock having two operative positions governing three passage-ways and a blank position in which liquid will not pass in either direction.

The plunger F has a vertical groove *n*, and

a block, pin, or screw n', secured to the collar e', projects into this groove and prevents the plunger from turning in the cylinder, while allowing it freedom to raise and lower.

In the upper head e of the cylinder is an air-vent t, which allows the air in the cylinder to escape when the piston moves upward and allows air to enter when the piston moves downward. This vent has a hood t' over it to prevent dust or dirt from getting into the cylinder.

A spiral spring a is seated in the central concavity h of the lower cylinder-head, which confines it in position and serves as a cushion to make an easy stop when the piston is lowered to its limit. Another spiral spring a' surrounds the plunger F above the piston C, and when the piston makes its upward movement to its limit this spring serves as a cushion to check its ascent.

The water or other liquid is liable to leak up between the piston-packing and cylinder-wall and thereby get above the piston-head, and this leakage will increase proportionately with the wear on the packing and will accumulate above the piston, so that when the piston is raised this water or liquid will be forced out through the openings or crevices in the top head of the cylinder and thence trickle down the outside onto the floor. It is important to obviate this difficulty. In Fig. 1 I have shown one form of construction for overcoming this objection. The lower end of the plunger F screws into the piston-head C and projects a short distance below the same. The piston-head is provided with a chamber or cavity q around the plunger, and the top surface of the head inclines from the outer edge to the said cavity q, in order that the water of leakage heretofore referred to will drain to the said cavity. A cross-passage q' is in the plunger and opens at two opposite sides into said cavity q and is adapted to receive the water therefrom, and said cross-passage is also in communication with a vertical port r in the plunger, whereby the water from the opening q will first pass into the cross-passage and thence through the said port into the cylinder below the piston-head, where it may drain out through the passage j, as will now be described.

The port r has a check-valve s in it, adapted to close upward and open by downward movement. The stem s' of this valve extends upward into the port, and a spring s^2, bearing lightly on the upper end of the stem, serves to press the valve normally off its seat in order to allow the leakage-water above the piston-head to exhaust, as above described. When water or liquid under pressure is admitted into the cylinder to raise the piston, the pressure of said liquid keeps the valve s seated, so that no liquid can pass up that way; but when that pressure is removed, as in the case when the liquid has been exhausted to lower the chair-body, the spring s^3 will force open the check-valve and allow the water of leakage to exhaust. It will be seen, therefore, that by this provision of valve the accumulation of liquid above the piston is prevented, and hence that the objection heretofore referred to is obviated.

An inverted cap d screws onto the lowermost projecting end of the plunger. This cap has a central opening to allow the water inlet and outlet and serves to limit the downward movement of the check-valve s. This inverted cap is provided on its bottom with cross-grooves d'. When the piston and plunger are at the limit of their downward movement, the spiral spring a is completely compressed, the several spirals being in close contact with each other. As the liquid-passage j opens through the lower head of the cylinder at the center of this spiral spring, it will be seen that the liquid would be prevented from flowing into the cylinder-space below the piston by the closed coils of the spring were it not for the cross-grooves d' in the inverted cap, through which the water can readily pass.

Fig. 6 shows a modification of the means for exhausting the leakage-water above the piston. Here the vertical wall of the cylinder A at one side is provided with a vertical passage r', whose upper end opens into the cylinder and through which the leakage-water exhausts when the piston-head is raised. The liquid exhausted through this vertical passage r' discharges through a pipe r^2, and, if desired, this pipe may connect with the exhaust-pipe k' at any point beyond the valve L. The plunger F is prevented from rotating by the groove n and block, pin, or screw n', as before described; but I have made provision for turning the base N of the chair-body and the said body (not shown) in a horizontal plane, so as to permit the chair-body to be adjusted on the plunger F to suit the convenience of the operator and clamped in any desired position. This provision is shown in Fig. 1 and comprises a circular head V, provided with a circumferential flange v' and a center opening in which the upper end of the plunger is rigidly secured. A chair-seat base N rests loosely upon and revolves on the circumferential flange v' of the fixed head. As the chair-body is to rest on this base, it may be turned. This chair-seat base N may be clamped rigidly to the head in order to hold the chair in any desired position by means of a split ring W. This ring is made of metal and is capable of springing or yielding a little and has a hole w' diametrically opposite its split ends, through which a screw x is passed to secure it to the chair-seat base N. The ring thus secured has its inner edge resting under the circumferential flange v' and engaging the circular surface of the fixed head V loosely enough to permit the chair-seat base N to freely revolve, but yet snug enough to insure that a slight contraction of

the ring will cause it to closely grip the said circular surface of the fixed head and thereby hold the chair-seat base immovable.

Each end of the split ring is halved and one end overlaps the other, and each of said ends has a lateral projection w^2 beyond the outer edge of the ring, and said projections are spread apart or separated by a comparatively narrow space y between them. By forcing these two projecting ends w^2 farther apart the split ring may be made to contract, with the result above stated. In order to cause this contraction, I have provided a screw Z, having a cone-pointed end z' adapted to enter the space y and force the two ends of the split ring apart and thereby contract the ring. The screw is mounted on the chair-seat base N and is turned by means of a crank-handle z^2. The split ring has two additional holes x', larger than the screws x^2 through them, so as to allow for contraction of the split ring. These screws x^2 are to support the split ring without interfering with its contraction and engage the chair-seat base N like screw x.

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

1. In a dental chair, the combination of a chair-base provided with a cylinder and supported on an annular rim forming a space or chamber, b', between said cylinder and the floor; a plunger in said cylinder and supporting the chair-body; a head closing the lower end of the cylinder and said head having in its lower side an enlarged part i, which occupies the said space, b', and has its end, i', projecting laterally beyond the cylinder-wall and said head, and provided with a passage, j, opening into the cylinder; a supply-inlet at one side and an exhaust-outlet at the opposite side and intersecting said passage at the said laterally-projecting end; and a valve at the intersection of the said passage and supply and exhaust and having a handle projecting through an opening in the annular rim to the exterior, said valve controlling all three passages.

2. In a dental chair, the combination of the chair-base provided with a cylinder; a plunger in said cylinder provided at its lower end with a piston-head, and said plunger supporting the chair-body; means to control the admission and exhaust of liquid under pressure to and from the said cylinder below the piston-head; a central chamber or cavity, q, on the top of the piston-head; a central port, r, in the plunger; a cross-passage, q', in the plunger connecting the said cavity and central ports; a check-valve controlling said port; and an inverted cap, d, on the lower side of the piston serving to limit the down movement of the check-valve.

3. In a dental chair, the combination of a chair-base provided with a cylinder; a plunger in said cylinder and supporting the chair-body; a head closing the lower end of the cylinder and said head having on its lower side an enlarged part, i, with its end, i', projecting laterally beyond said head and provided with a passage, j, opening into the cylinder; a supply-inlet at one side and an exhaust-outlet at the opposite side and intersecting said passage at the said laterally-projecting end; and a valve at the intersection of the said passage and supply and exhaust, said valve controlling all three passages.

4. In a dental chair, the combination of a chair-base provided with a cylinder; a plunger in said cylinder and supporting the chair-body; a circular head rigidly mounted on the plunger; a chair-seat base mounted to revolve on said circular head; a split ring secured at one point to the said chair-seat base and surrounding the said circular head; and means mounted on the chair-seat base and acting on the split ends of the ring to cause the contraction of the ring and clamp the chair-seat base immovably.

5. In a dental chair, the combination of a chair-base provided with a cylinder; a plunger in said cylinder and supporting the chair-body; a circular head rigidly mounted on the plunger; a chair-seat base mounted to revolve on said circular head; a split ring secured at one point to the said chair-seat base and surrounding the circular head, the ends of said ring overlapping and projecting laterally beyond the ring; and a screw mounted on the chair-seat base and provided with a cone-pointed end to spread the said overlapping ends of the ring apart and thereby contract the ring and cause it to clamp the chair-seat base immovably.

6. In a dental chair, the combination of a chair-base provided with a cylinder having a bottom head with a central concavity, h; a plunger and piston in said cylinder and supporting the chair-body; a spiral spring, a, seated in said concavity in the bottom head of the cylinder; and an inverted cap, d, on the end of the plunger below the piston and provided on its bottom surface with cross-grooves, d', as and for the purpose described.

7. In a dental chair, the combination of the chair-base provided with a cylinder; a plunger in said cylinder provided at its lower end with a piston-head, and said plunger supporting the chair-body; means to control the admission and exhaust of liquid under pressure to and from the said cylinder below the piston-head; a central chamber or cavity, q, on the top of the piston-head; a central port, r, in the plunger; a cross-passage, q', in the plunger connecting the said cavity and central port; and a check-valve controlling said port, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM B. MANN.

Witnesses:
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LEE I. VAN HORN.