No. 853,421. PATENTED MAY 14, 1907.

F. RITTER.

DENTAL CHAIR.

APPLICATION FILED SEPT. 16, 1901.

3 SHEETS—SHEET 1.

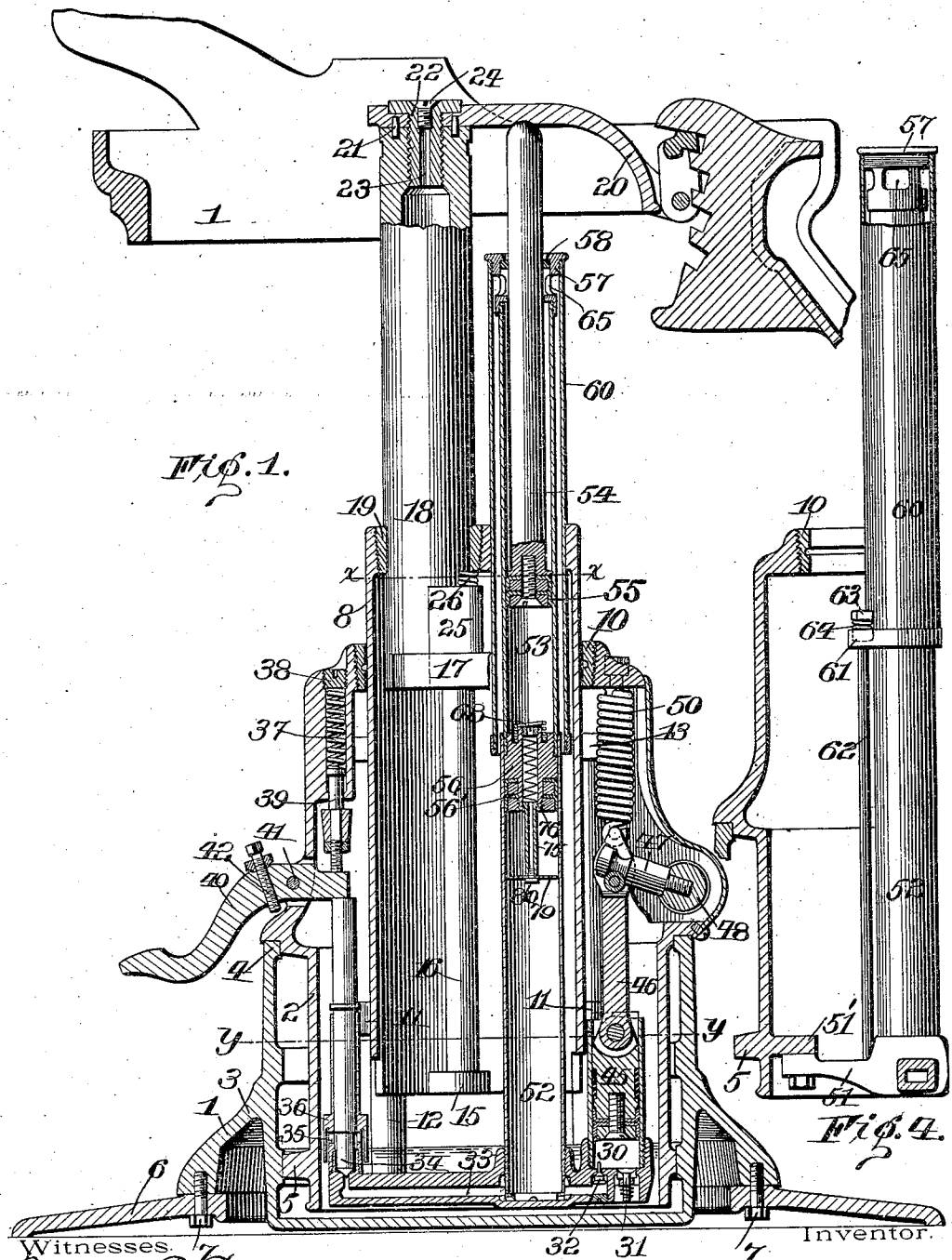


Fig. 1.

Fig. 4.

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3 SHEETS—SHEET 2.

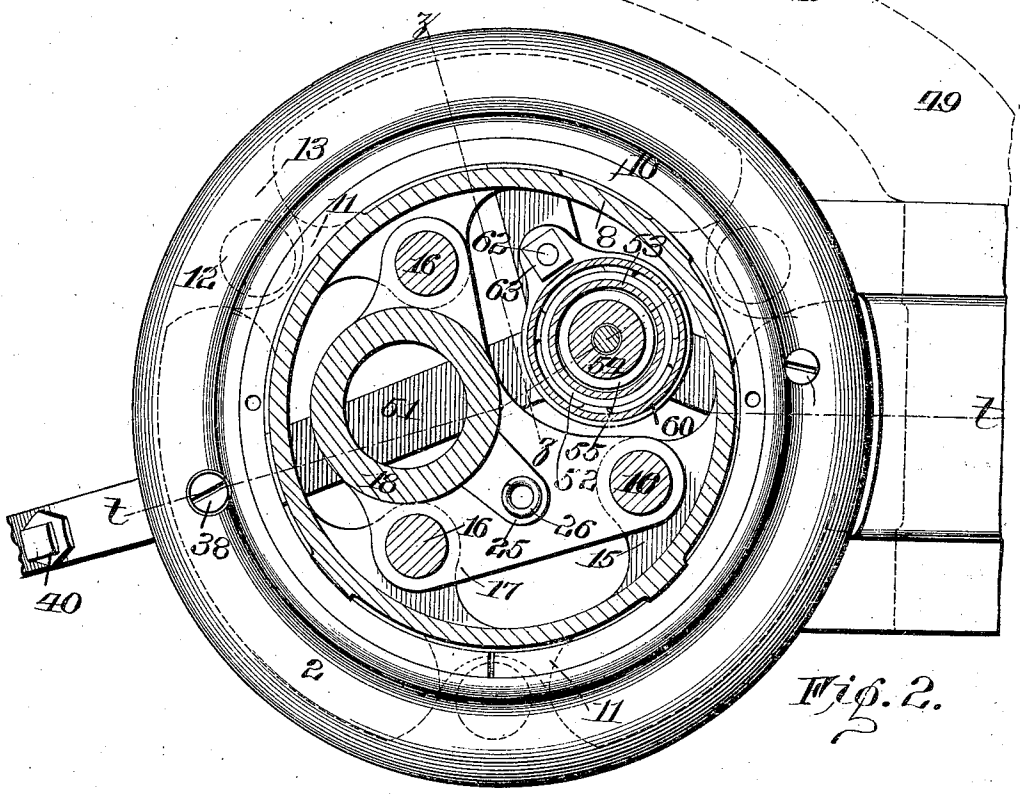


Fig. 2.

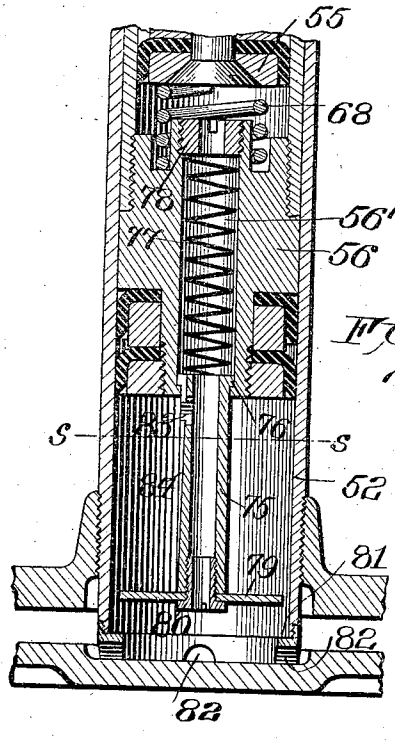


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 6.

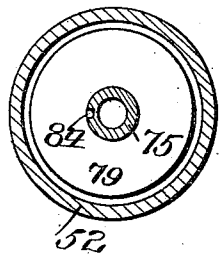
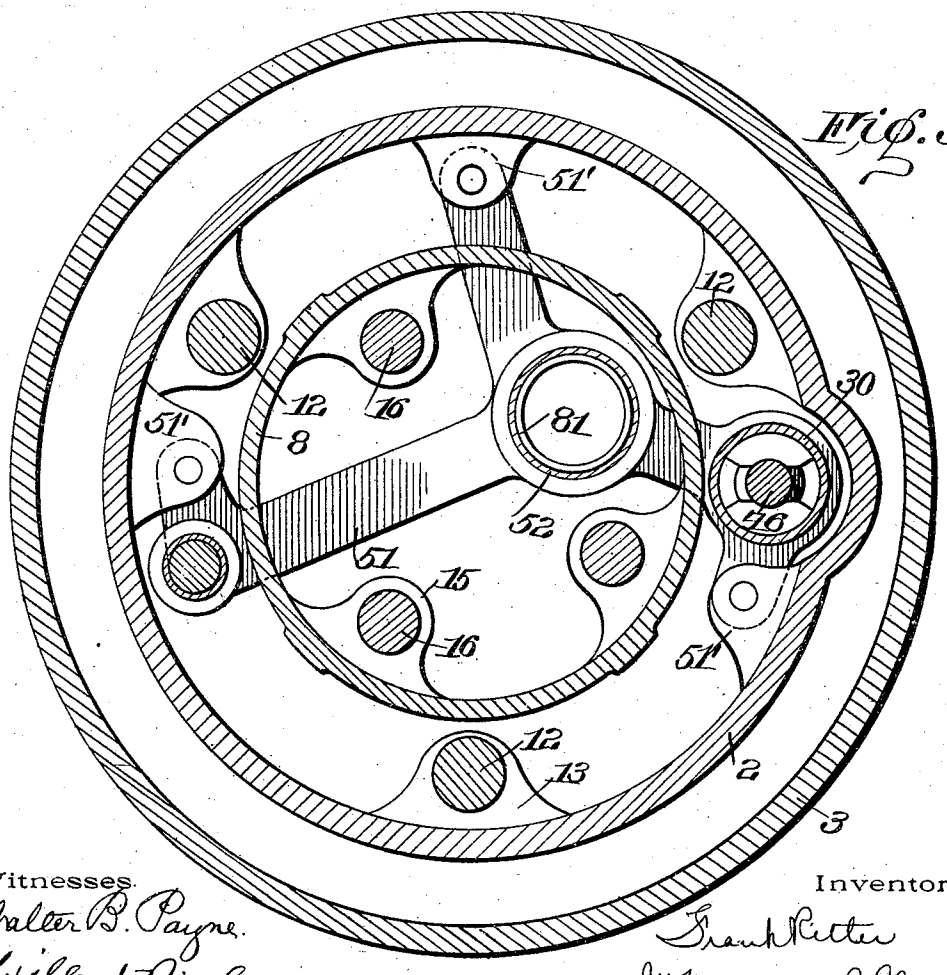


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK RITTER, OF ROCHESTER, NEW YORK.

DENTAL CHAIR.

No. 853,421. Specification of Letters Patent. Patented May 14, 1907.

Application filed September 16, 1901. Serial No. 75,569.

To all whom it may concern:

Be it known that I, FRANK RITTER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Dental Chairs; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to adjustable dental, surgical or barbers chairs and it has for its object to provide an improved form of standard and elevating mechanism which shall be compact and adapted to permit a vertical movement of the chair of considerable latitude from its lowest to its highest position, and to support the seat rigidly at any desired position of adjustment and also to guide the chair in such a manner that it may be operated smoothly.

It has for its further object to provide a controlling device whereby the movement of the chair is automatically controlled to prevent jarring when it approaches the limit of its downward movement.

To these and other ends the invention consists in certain improvements in construction and combinations of parts, all as will be hereinafter fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings: Figure 1, is a vertical sectional view on the line *t*—*t* of Fig. 2, showing the elevating mechanism constructed in accordance with my invention showing the chair seat in section. Fig. 2, is an enlarged sectional view on the line *x*—*x* of Fig. 1. Fig. 3, is a similar view on the line *y*—*y* of Fig. 1. Fig. 4, is an enlarged side elevation of the ram cylinders, showing a portion of the casing in section, and taken on the line *z*—*z* of Fig. 2. Fig. 5, is an enlarged sectional view of the ram controlling valve, and Fig. 6, is a cross sectional view on the line *s*—*s* of Fig. 5.

Similar reference numerals in the several figures indicate similar parts.

The mechanism forming the subject of this invention embodies a collapsible and preferably telescoping standard and a lifting mechanism which form a support for the chair, the seat frame 1 of which latter is shown in section, the lower standard section or pedestal 2 being revolubly mounted in a cylindrical base 3 and supported on an annular flange 4 engaging the top of the base and having near its lower end a bearing surface 5 coöperating with a similar surface upon the interior of the base to insure stability of the parts. The base 3 is closed at the bottom and adapted to contain oil or other liquid by means of which the hydraulic lifting mechanism is operated, and it is mounted upon a broad rim 6 resting upon the floor and to which it is attached by means of screws 7.

Mounted in the pedestal is a vertically movable cylindrical intermediate standard section 8 having its upper end projecting through an adjustable collar 10 and having its lower end provided with the outwardly extending lugs 11 embracing the guide rods 12 rigidly supported, by the lugs or ears 13, in the pedestal. Arranged within the section 8 on the lugs 15, are similar guide rods 16 carrying a frame 17 attached to the lower end of the upper telescoping standard section 18 the upper portion of which projects through an adjustable collar 19 in the top of the section 8 and is attached to the seat frame 1 by any suitable means. In the present instance I have shown the seat frame provided with a cross bar 20 which is attached to the said section by dowel pins 21 and a screw 22 which is provided with an aperture 23 through which the oil or other liquid may be conveniently supplied to the interior of the base by removing the closure cap or screw 24. The upward movement of the section 18 is limited by a lug 25 on the frame 17 which abuts against the inner side of the head on the section 8 and in a recess in the lug is a spring 26 which prevents a sharp contact between the parts.

The operating pump is similar to the one shown in my prior Patent No. 619,226, granted Feb. 7, 1899, and consists generally of the cylinder 30 having the inlet check valve 31 opening from the base 3 into the cylinder, and the outlet check valve 32 communicating with the passage 33 leading to the regulator valve. The regulator consists of a valve stem 34 closing the end of said passage and adapted when raised by the pressure of the liquid to allow it to flow outward through the passages 35 in the valve casing opening within a hood 36 the lower open end of which is adapted to lie below the surface of the liquid in the base 3. The valve stem is normally held in a closed position by a spring 37 lying beneath a screw 38, in a recess formed in the side of the pedestal, and operating a plunger 39 bearing

against the inner end of a releasing lever 40 which lies between it and the stem 34. The lever is pivoted at 41 and by applying pressure to the outer end of the lever the plunger 39 will compress the spring 37 and permit the valve to be raised by the pressure of the liquid. A set screw 42 located on the lever is adapted to engage the side of the pedestal to limit its movement. Operating in the pump cylinder is the piston head 45 to which is attached the rod 46 adapted to be moved in one direction by the stud or pin 47 on an oscillatory shaft 48, journaled in the pedestal 2 and having attached to its outer end an operating lever 49 (shown in dotted lines in Fig. 2). Attached to the upper end of the rod 46 is a spring 50 by means of which the piston and lever 49 are returned to normal position after each operation. The pump and the devices operated thereby are supported by means of a hollow spider or frame 51 bolted or otherwise secured to the ears or lugs 51′ upon the inner side of the pedestal so that as the latter is revolved within the base said parts are carried therewith.

The elevating mechanism is mounted within the pedestal and operates at the side and exterior of the telescopic guide section 18 and it consists of a ram embodying a stationary cylinder 52 which communicates, at its lower end with the passage 33, and is provided with a movable telescopic cylinder or section 53 in which operates the ram plunger 54 provided with the piston head 55 having the usual packing. The movable cylinder constitutes a piston and is also provided with the piston head 56 having the central aperture 56′ and its upper end projecting above the guide section 8 is provided with a cap 57 surrounding the ram plunger 54 and containing packing or a wiping washer 58. A dust hood or protector in the form of a tube 60 is attached to the cap and surrounds the movable cylinder 53 having its lower end extending in proximity to the upper end of the stationary cylinder 52 when extended, where it is provided upon the exterior with a lug 61 having an aperture through which extends a rod 62, connected at its lower end to the spider or frame 51 and at its upper end provided with a nut or head 63 (see Fig. 4) for limiting the upward movement of the cylinder 53.

64 is a coil spring located between the lug 61 and the head 63 to quietly arrest the movement of the cylinder and prevent it jarring against the stop when reaching the limit of its upward movement.

The upper end of the ram plunger 54 engages the cross bar on the seat frame and in operation the liquid supplied by the pump passing into the cylinder 52 raises the movable cylinder 53 and the ram plunger, carrying with them the seat frame, the liquid passing through the aperture 56′ in the head 56. The extreme upward movement of the cylinder is limited by the stop 63 and lug 61. The tube 60 carried by the movable cylinder protects the latter from dust as well as preventing contact with its oily surface and the apertures 65 located in the cap 57 below the packing 58 allows any liquid that may work past the head 55 to be returned into the base 3 through the passage between the hood or casing and the cylinder without showing on the exterior of the base, or being exposed to catch dust etc.

It has been heretofore explained that the downward movement of the chair is controlled by the stem 34 in the regulator valve and when it is desired to lower the chair the valve being opened by the releasing lever 40 the liquid is allowed to escape into the base from the passage 33 permitting the ram plunger 54 to descend, its head 55 engaging the spring 68 on the piston head 56 in its continued downward movement. In order to automatically cushion the parts as the chair approaches the limit of its downward movement, I provide a graduating valve device carried by the movable cylinder or piston section 53 which will control the outward flow of the liquid therefrom to gradually diminish the movement of the plunger with the piston section 53 and chair until it is at its normal position of rest. Arranged in the central aperture 56′ is a tubular stem 75 movable longitudinally in the piston head 56 and secured therein by means of an annular flange or rim 76 at its upper end engaging a similar rim on the head and normally held in contact therewith by a spring 77 the tension of which may be regulated by a hollow screw 78 also serving to hold it in place. At the lower end of the stem is a disk or valve 79, secured thereon by means of an apertured screw 80, and adapted to engage with an annular seat 81 in the bottom of the stationary cylinder 52 and above the apertures 82 which connect said cylinder with the passage 33. Arranged in the side of the stem is an aperture 83 located just below the face of the piston head 56 to permit the passage of the liquid from between the valve 79 and head 56, at first when the valve engages the seat 81, the subsequent movement of the cylinder or section 53 being controlled by a longitudinal slot 84 the bottom of which extends at an angle to the side of the stem so that the upper end of the slot has the greater depth and its area constantly decreases as it approaches the valve at the lower end of the stem. When the parts descend in the cylinder 52 the valve 79 engaging the seat 81 prevents the outward movement of the liquid included between the valve and the piston head 56 which at first can escape through the aperture 83 and later, only through the slot 84 the area of which is gradually diminished as the piston 56 descends thereby regulating the flow of the liquid which passes outwardly

through the central aperture in the stem and thence into the passage 33.

During the descent of the pistons the pressure on opposite sides of the disk or valve 79 is balanced and the disk and stem are projected but when said disk is arrested the only escape for the liquid is through the reduced passage arresting the seat gradually and without jar.

The lifting mechanism described irrespective of the checking device on the end of the ram plunger enables me to give to the seat a considerable variation of adjustment and facilitates repairs and repacking of the pistons when desired without entirely dismantling the chair, at the same time by locating the lifting plunger forward of the standard, I provide an increased bearing on the seat frame to prevent binding of the standard guiding sections when the patient's weight is on the forward platform of the chair. This bearing of the plunger on the seat or chair is far enough forward to permit these results to be accomplished and at the same time it permits the use of cylindrical standard sections.

I claim as my invention:

1. The combination with a base, a telescoping standard therefor embodying the lower, intermediate and upper standard sections revolubly mounted on the base and a chair mounted on the upper section, of a telescoping lifting mechanism embodying a lower stationary cylinder, an intermediate movable cylinder and a movable plunger all located within the intermediate standard section and arranged exteriorly of the upper section and a tubular guard connected to the upper end of the intermediate cylinder and extending over the lower cylinder in the intermediate section when the chair is raised.

2. The combination with a base, a standard therefor embodying a plurality of telescoping sections and a chair connected to the upper one of said sections, of a hydraulic lifting mechanism, arranged exteriorly of the section connected to the chair, embodying the stationary and intermediate and upper movable sections, collapsing within the other standard sections, a tubular sleeve attached to the intermediate lifting section and extending over the latter and the lower lifting sections.

3. The combination with a chair and an extensible standard therefor, of a hydraulic lifting mechanism for the chair embodying a cylinder and a piston head operating therein, a fluid escape passage leading from the cylinder beneath the piston head, and a valve for controlling the flow of liquid through the escape passage closed by the descent of said head, and a contracted fluid escape passage or by-pass connecting the cylinder, between the piston head and valve, with the fluid escape passage.

4. The combination with extensible telescopic standard sections and a chair mounted on one of them, of a hydraulic lifting mechanism arranged exteriorly of the section connected to the chair, embodying a stationary cylinder, an intermediate movable cylinder fitting the former and an upper movable piston in the intermediate cylinder engaging the chair, a tubular cover or casing connected to the upper end of the intermediate cylinder and extending over the lower stationary cylinder into its inclosing portion of the standard and fluid escape passages between the cover and its cylinder.

5. The combination with telescoping standard sections and a chair mounted on one of them, of a hydraulic lifting mechanism arranged exterior of the section on which the chair is mounted, embodying a lower stationary cylinder, an intermediate movable cylinder and an upper movable piston engaging the chair, a tubular cover connected to the upper end of the intermediate cylinder and extending into the other sections of the standard and surrounding the lower stationary cylinder and a stop coöperating with the cover to limit the upward movement of the intermediate cylinder.

6. The combination with the chair and an extensible standard therefor, of a hydraulic lifting mechanism embodying a lower stationary cylinder, an intermediate movable cylinder and a movable piston operating in the cylinder and coöperating with the chair, the cap piece connected to the end of the intermediate cylinder having apertures connecting with the interior thereof, the outer tubular cover carried on the movable cylinder and extending over the lower cylinder and a wiper arranged in the cap above the apertures.

7. The combination with a chair, and an extensible standard, therefor, of a hydraulic lifting mechanism embodying the lower stationary cylinder, the intermediate movable cylinder and the inner piston operating upon the chair, the tubular cover connected to the upper portion of the intermediate cylinder and extending over the lower cylinder into one of the sections of the standard and having the projection at the bottom and the rod with which said projection coöperates to limit the upward movement of the intermediate cylinder.

8. The combination with a chair and an extensible standard therefor, of hydraulic lifting and lowering mechanism embodying a cylinder, a piston movable therein and operating upon the chair, a fluid discharge passage from the cylinder, a valve mounted on the piston adapted to close the fluid discharge passage and a by pass leading from the cylinder between the valve and piston and connecting with the discharge passage.

9. The combination with a chair and an

extensible standard therefor, of a hydraulic lifting and lowering mechanism embodying a cylinder, a piston movable therein, operating upon the chair, a fluid discharge passage from the cylinder, a valve having a passage connecting the cylinder with the discharge passage which is of gradually decreasing area and means for operating said valve relatively to the movement of the piston.

10. The combination with the chair and an extensible standard therefor, of a hydraulic raising and lowering mechanism embodying a cylinder, a piston movable therein and operating upon the chair, a fluid discharge passage from the cylinder, a valve carried by and movable relatively to the piston coöperating with and closing said passage and having an escape passage through it the area of said escape passage being controlled by the relative movements of the valve and piston.

11. The combination with the chair, and an extensible standard therefor, of a hydraulic raising and lowering mechanism embodying a cylinder having a valve seat therein at its discharge end, a piston operating in the cylinder, the valve at the end of the piston coöperating with the seat, and provided with the hollow stem having an aperture therein.

12. The combination with a chair and an extensible standard therefor, of a hydraulic elevating and lowering mechanism for the chair embodying a cylinder having a valve seat at its end, the piston operating in the cylinder, the movable valve on the piston adapted to coöperate with the seat in the cylinder and provided with the tubular perforated stem.

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