2 Sheets—Sheet 1.

J. G. CANNON.

Elevating Chair.

No. 241,614. Patented May 17, 1881.

Fig 1.

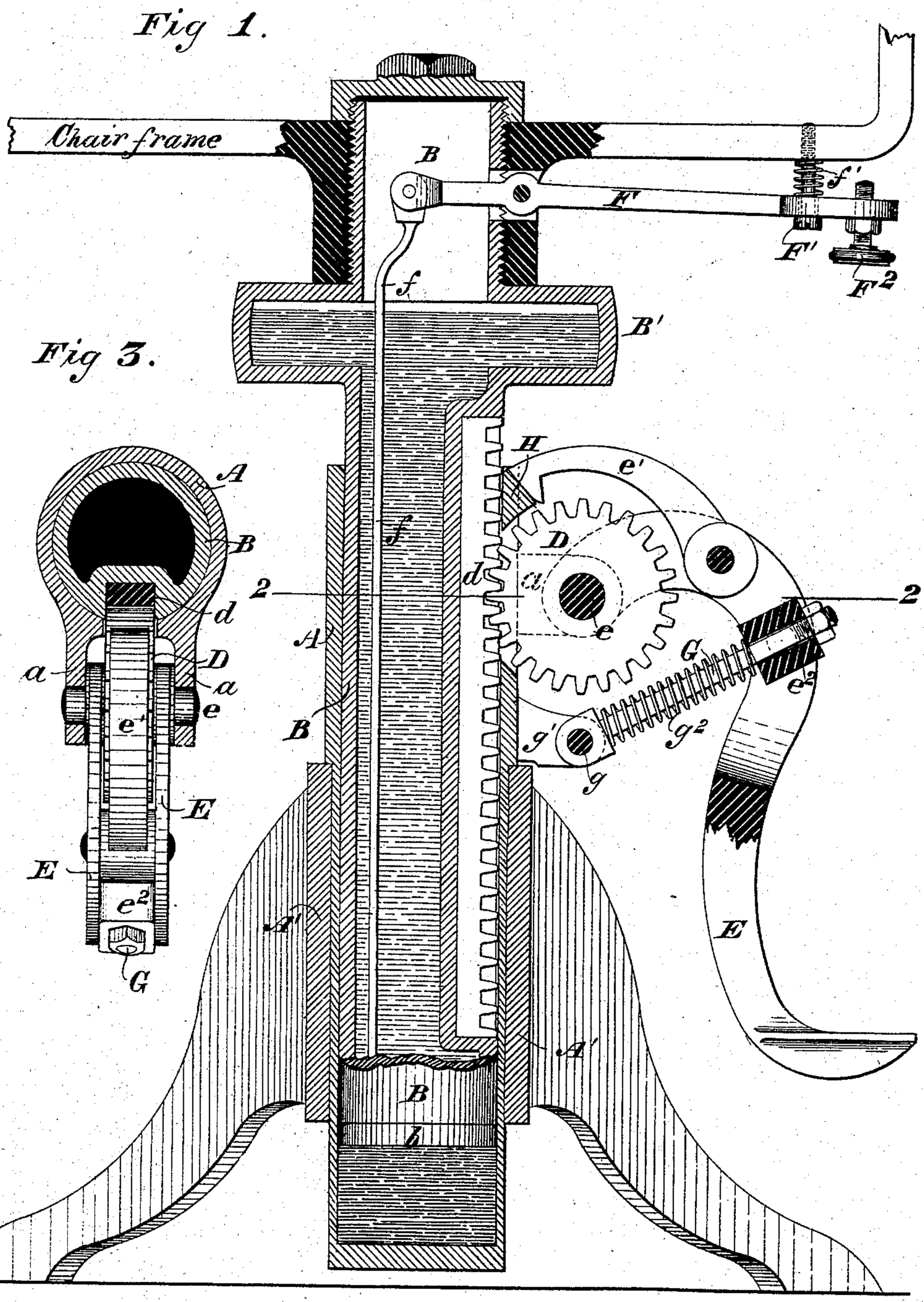

Fig 3.

WITNESSES

Wm a Skinkle

Geo W. Breck

INVENTOR

John. G. Cannon.

By his Attorneys.

Baldwin, Hopkins & Peyton

2 Sheets—Sheet 2.

J. G. CANNON.

Elevating Chair.

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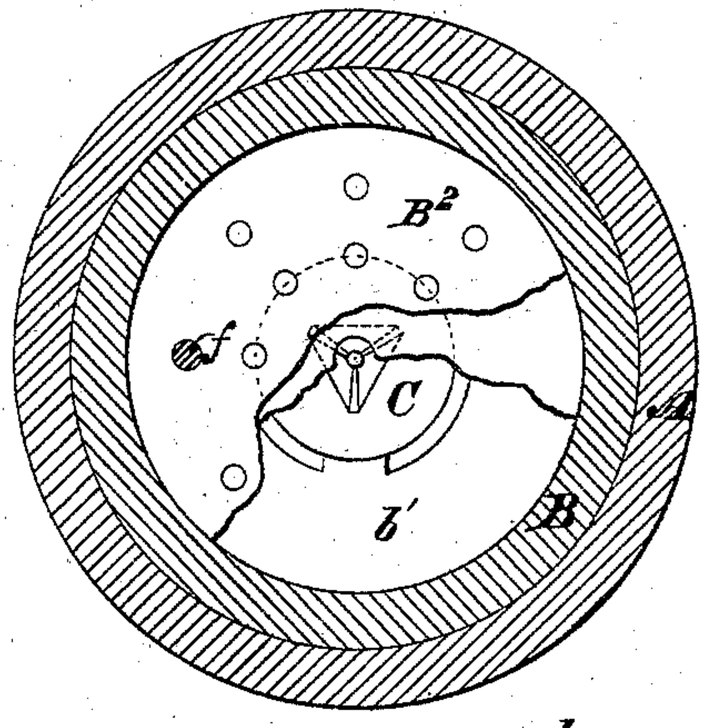
Fig 5.



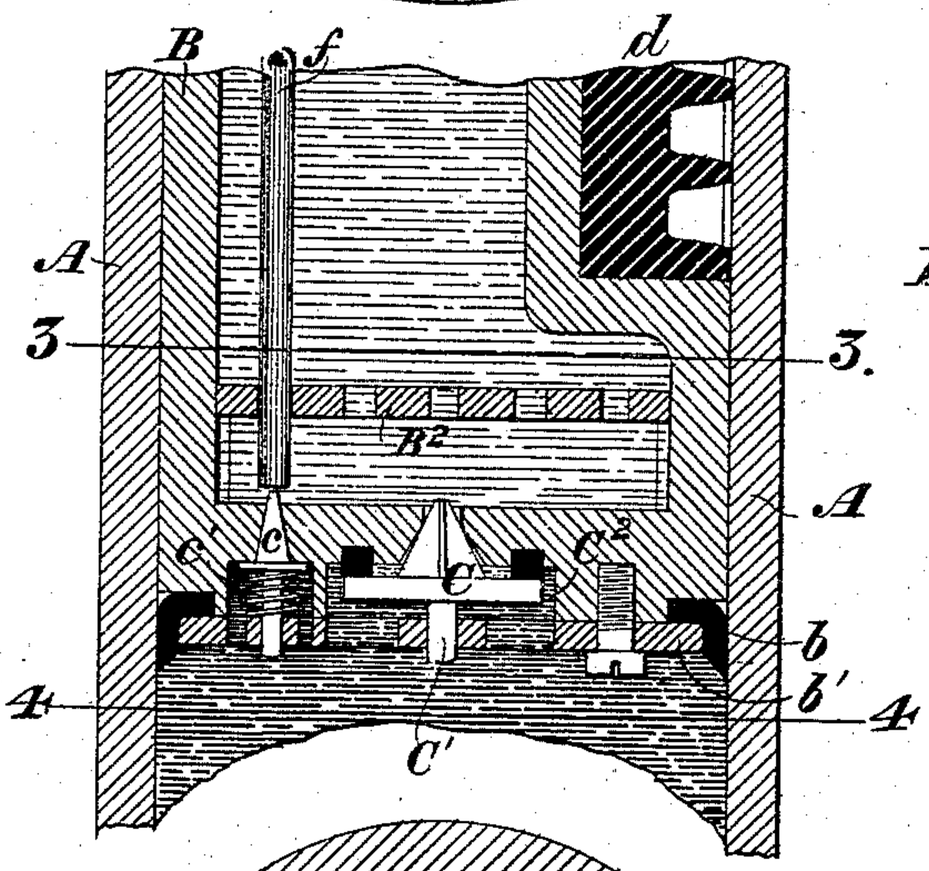


Fig 4

Fig 2.

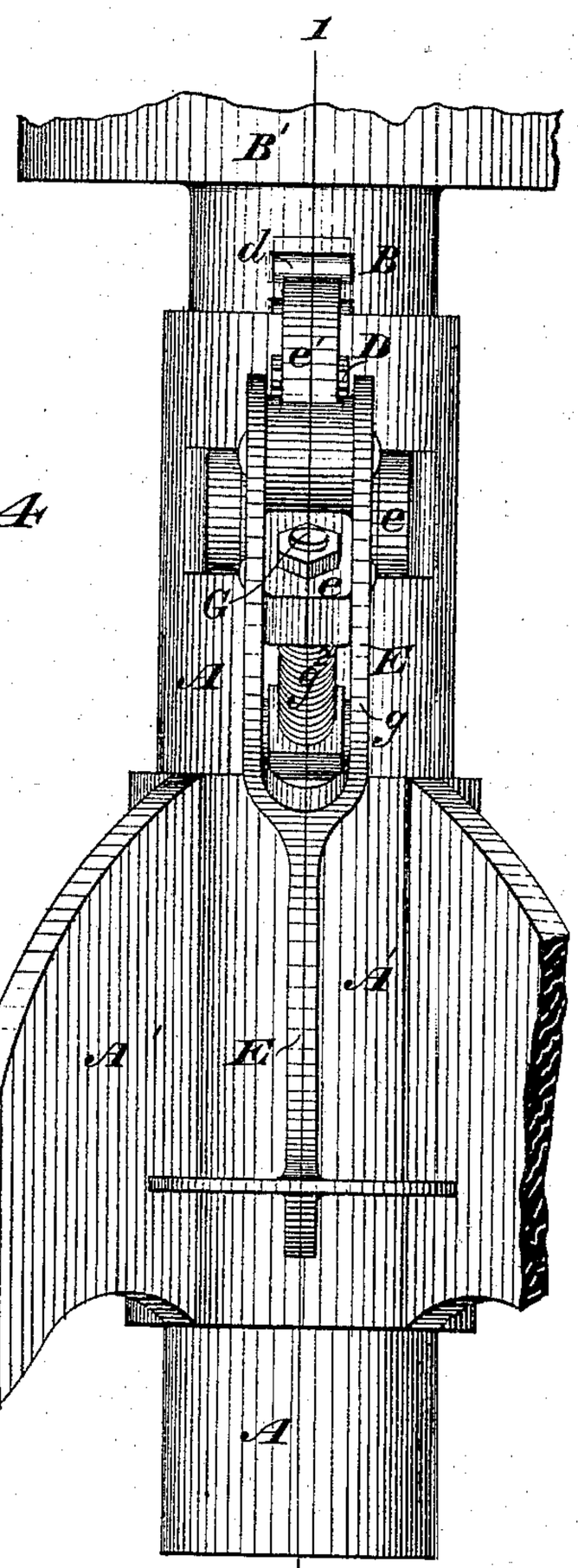
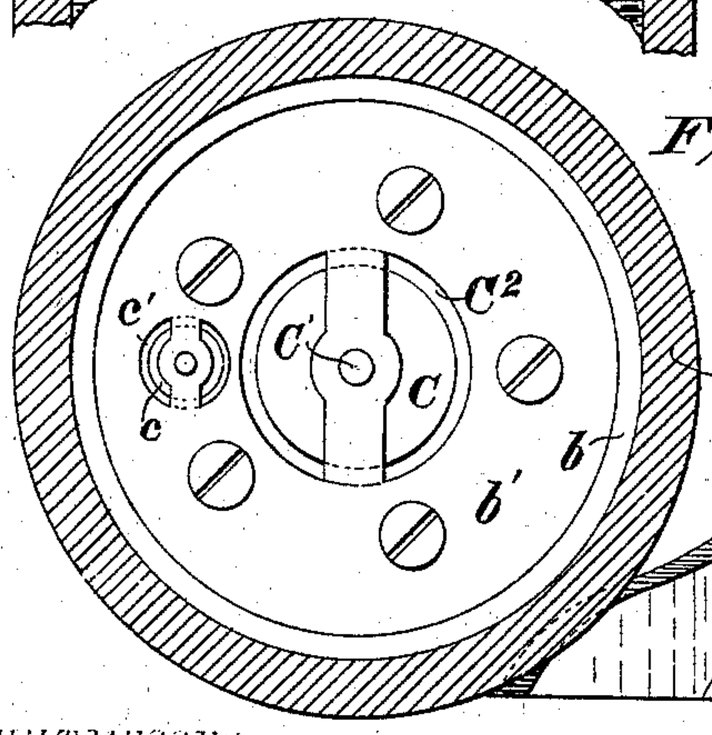


Fig 6.



WITNESSES

Wm A Skinkle

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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN G. CANNON, OF BALTIMORE, MARYLAND, ASSIGNOR TO SAMUEL S. WHITE, OF PHILADELPHIA, PENNSYLVANIA; J. CLARENCE WHITE AND SAMUEL S. WHITE, JR., (EXECUTORS OF SAID SAMUEL S. WHITE, DECEASED,) ASSIGNORS TO JAMES W. WHITE, JAMES CLARENCE WHITE, AND H. M. LEWIS, TRUSTEES, ALL OF SAME PLACE.

ELEVATING-CHAIR.

SPECIFICATION forming part of Letters Patent No. 241,614, dated May 17, 1881.

Application filed November 24, 1877.

To all whom it may concern:

Be it known that I, JOHN G. CANNON, of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Elevating-Chairs, of which the following is a specification.

The object of my invention is to simplify and improve the organization of chairs employing a fluid-column to support the chair body or seat at the desired elevation. The patent of Bramble and Deihl, of 1868, reissued to S. S. White, June 25, 1878, as No. 8,294, shows and describes such a seat-supporting fluid-column.

The subject-matter claimed will hereinafter specifically be designated.

In the accompanying drawings, Figure 1 represents a vertical central section through so much of a chair provided with my improvements as is necessary to illustrate the subject-matter herein claimed, the section being taken on the line 1 1 of Fig. 2. Fig. 2 is a rear elevation thereof; Fig. 3, a horizontal section on the line 2 2 of Fig. 1; Fig. 4, a vertical central section, on an enlarged scale, through the lower end of the piston, showing the details of construction of the valves and packing-ring; Fig. 5, a horizontal section on the line 3 3 of Fig. 4, with some of the parts broken away to show more clearly the portions lying beneath them; and Fig. 6 is a bottom-plan view of the under side of the piston in section on the line 4 4 of Fig. 4.

An accurately-bored cylinder, A, is shown as supported by and swiveling in the chair-base A′. A hollow or tubular piston, B, firmly secured at its upper end to the chair frame or seat, works freely up and down in the cylinder A, which is provided with a closed bottom, and carries upon its lower end a suitable packing-ring, *b*, to insure a tight joint. This packing-ring, in the present instance, lies in an annular recess formed around the bottom edge of the piston, and is held firmly in place by a perforated plate, *b′*, secured upon the end of the piston by suitable means. The bottom of the hollow piston is also provided with a circular recess, C^2, and with a conical valve-opening leading to the interior of the piston. A valve, C, closes this opening, and consists, in the present instance, of a conical portion the base of which is a flat disk, and a spindle, C′, projecting from the back of the disk through a guide-opening in the plate *b′*, between which plate and a suitable packing-ring, c^2, let into a groove in the face of the recessed portion C^2, the flat disk portion of the valve works, being held to its seat upon the packing when at rest and when the piston is moving downward by the pressure of the fluid in the cylinder beneath. A second valve, *c*, somewhat similar in construction, but of smaller area than the valve C, and opening outward, as does that valve, is also provided in the bottom of the piston, its spindle working through a guide-opening in the plate *b′*, and being encircled by a spiral spring to facilitate the closing of the valve and to keep it normally pressed against its seat, in addition to the pressure of the fluid beneath. The end of this valve extends entirely through the bottom of the piston and projects a short distance above it, in order to be operated upon, and the valve opened by a rod, *f*, suspended over but just out of contact with it, which rod is properly guided at its lower end by passing through a perforated disk, B^2, secured in the cylinder near its bottom, its upper end, which extends to near the top of the piston, being pivoted to the inner end of a rocking lever, F, projecting through a slot in the side of the piston. The outer end of this lever extends to a point within convenient reach of the operator's hand, and is provided with an aperture, through which a screw, F′, passes to limit the downward movement of the lever. A spiral spring, *f′*, encircling this screw, bears against the lever and forces it down upon the head of the screw, thereby keeping the rod *f* suspended from the opposite end of the lever raised and out of contact with the valve *c*. A thumb-screw, F^2, limits the upward movement of the lever by coming in contact with a portion of the chair-frame.

It will be seen from what has been said that the range of movement of the lever F may be varied by adjustment of the screws F′ F^2, so that I am enabled to determine with accuracy

the extent to which the outlet-valve *c* is opened or forced from its seat, and this feature is one of much importance in some constructions.

The tubular piston, if desired, may be provided with an enlargement, B′, constituting a reservoir for the fluid, to compensate for the difference in area between the piston and cylinder.

For stools or ordinary chairs the raising and lowering may be done by hand; but for heavy chairs—such as those used by barbers, dentists, and others—I prefer to employ a lifting device. This consists of a rack, *d*, formed in a recess in the hollow piston directly opposite a vertical slot in the wall of cylinder A, through which slot works a pinion or spur wheel, D, journaled in suitable lugs formed on the cylinder, the teeth of which pinion mesh with those of the rack and prevent axial movement of the piston in the cylinder. The pinion is turned by means of a bifurcated foot-lever, E, swinging on the shaft of the pinion, between the forks of which is pivoted a gravity-pawl, *e′*, engaging the teeth of the pinion when the lever is depressed. The lever carries a cross-head, e^2, through which passes a rod, G, pivoted at *g* between lugs *g′* formed on the cylinder; and encircling this rod is a compressed spiral spring, g^2, which bears against the cross-head e^2, and the thrust of which tends to throw the lever away from the cylinder until its outward movement is checked by the nut on the end of the rod.

A beveled lug or projection, H, is formed upon the cylinder immediately above the slot through which the pinion D works, and lies directly in the path of the pawl *e′*, keeping it out of engagement with the teeth of the wheel when the lever E is released from the pressure of the foot of the operator and thrown to its farthest outward movement by the spring g^2.

The operation of my improved device is as follows: Supposing the chair to be at its lowest position, the piston and its reservoir and the small space in the cylinder below the piston would be filled with any suitable fluid, preferably oil, and the large valve C, having no pressure below it to overcome its gravity, would fall against the plate *b′* and open. When it is desired to elevate the chair the operator presses his foot upon the lever E, swinging its lower end in toward the cylinder and drawing the pawl from its resting-place on the inclined lug into engagement with the teeth of the wheel D, causing it to rotate, and through its engagement with the teeth of the rack to elevate the piston and chair frame or seat carried thereby. This causes the fluid in the piston to flow through the valve-openings and fill the increased space in the cylinder, holding the valves open so long as the upward movement of the piston is continued. When the pressure of the foot is taken from the lever E the piston will lower slightly or settle back, causing the fluid below to act upon the valve C and carry it up against its seat on the packing-ring to close the valve-opening, in which position it will be firmly held by the pressure of the fluid, which is practically non-elastic. As the limited movement of the lever will only partially rotate the pinion D, the operation of pressing in the lever with the foot must be repeated until the chair is raised to the desired height. When the lever is released by the foot it is pressed outward by the spring and the pawl *e′* thrown forward far enough to slide up on the inclined lug H and out of engagement with the teeth of the pinion D. This leaves the piston cushioned on or supported by the fluid beneath it. When it is desired to lower the chair the operator simply presses up the outer end of the lever F, which lowers the inner end and brings the end of the rod *f* in contact with the valve *c*, which is so small as to be easily opened against the pressure of the fluid below it. This allows the fluid in the cylinder below the piston to flow back into the piston; but the area of the valve-opening is so small that the flow is limited, and the fall of the piston so slow that when checked by the closing of the valve no shock or jar would be felt by a person in the chair.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, substantially as herein-before set forth, of the cylinder mounted upon the base of the chair, the piston secured to the seat of the chair, its lifting-rack, the pinion-wheel, and the ratchet-lever operating upon the wheel.

2. The combination, substantially as herein-before set forth, of the fluid-cylinder, the seat-supporting piston, the mechanism for elevating said piston relatively to the cylinder, the outlet-valve, the rod for operating said valve, the lever or handle to control the movements of said valve-rod, and the adjusting devices to determine the range of movement of said lever, whereby the extent to which the outlet-valve is forced from its seat may be varied.

3. The combination, substantially as herein-before set forth, of a fluid-cylinder, a tubular piston movable endwise therein, valves communicating between the cylinder and piston, and a perforated plate attached to the bottom of the piston, in which plate the spindles of the valves work, and by which the outward movement of the valves is regulated without interfering with free communication between the piston and cylinder.

4. The combination, substantially as herein-before set forth, of the fluid-cylinder, the tubular piston, communicating valves between the cylinder and piston, the perforated plate guiding the valves and limiting their outward movement, and a packing-ring or gasket interposed between the piston and plate to preserve a tight joint between the cylinder and piston.

In testimony whereof I have hereunto subscribed my name.

JOHN G. CANNON.

Witnesses:
WM. D. BALDWIN,
WM. J. PEYTON.