

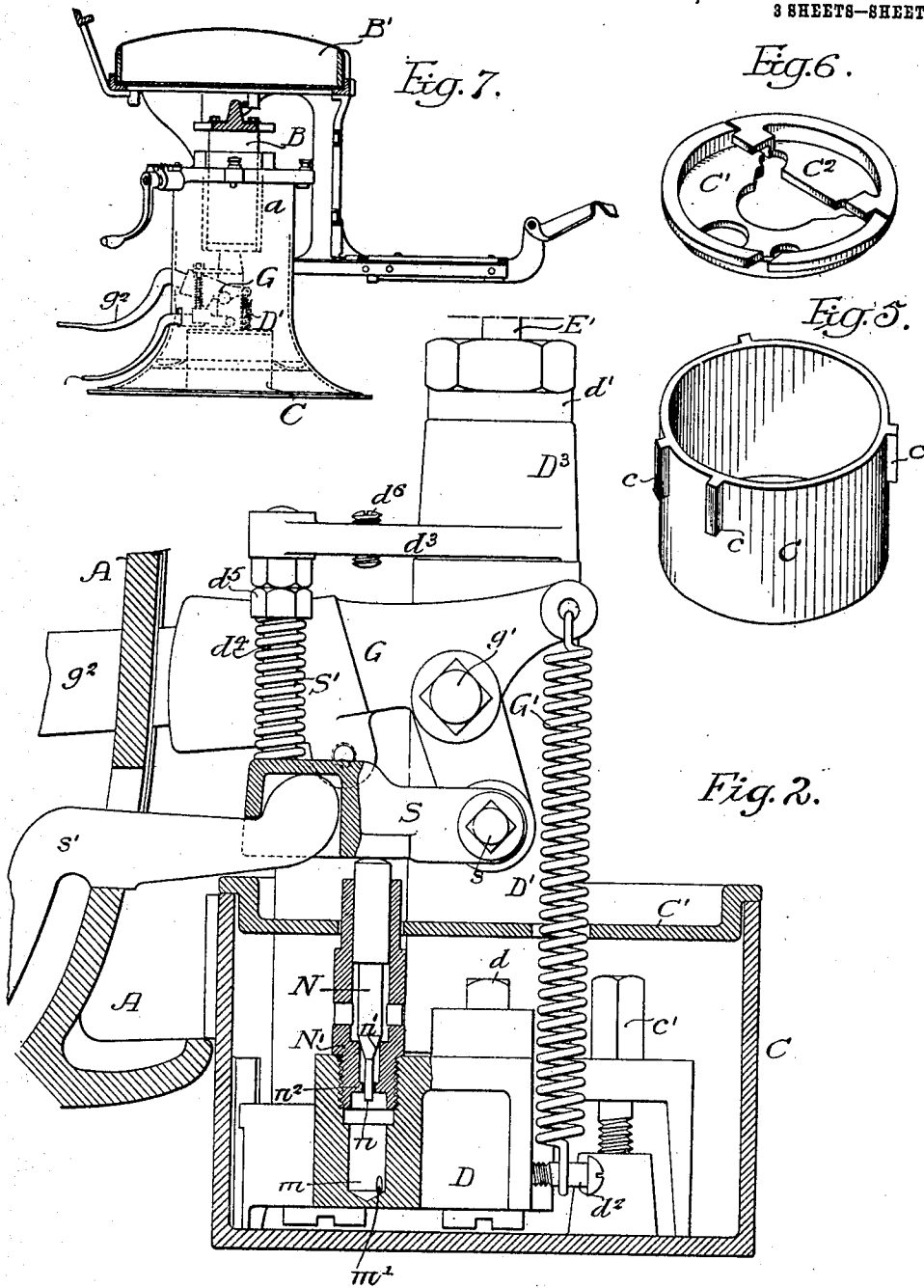
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PATENTED APR. 21, 1908.

J., A. & J. P. BARKER.
HYDRAULIC ELEVATOR FOR CHAIRS.

APPLICATION FILED MAY 1, 1907.

3 SHEETS—SHEET 2.



Witnesses:
Valter H. Chalmers
Augustus B. Clapp

Inventors,
James Barker
Alfred Barker
Joseph P. Barker
 by their Attorneys,
Norman, Norman

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Fig. 3.

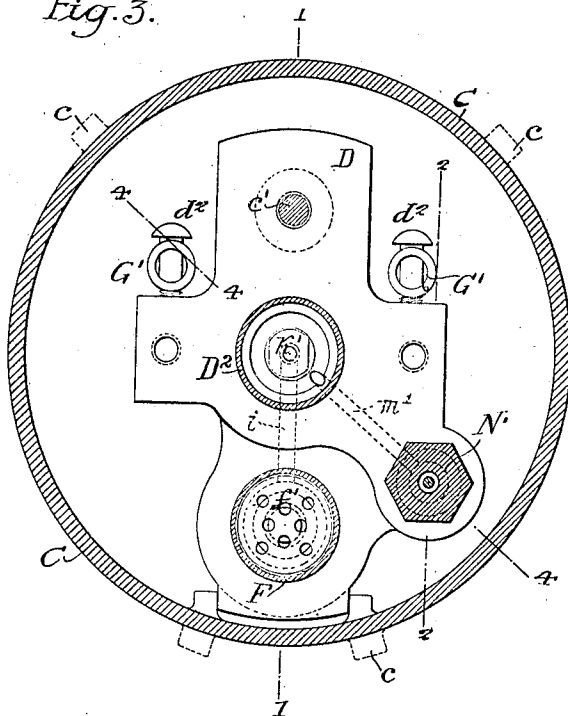
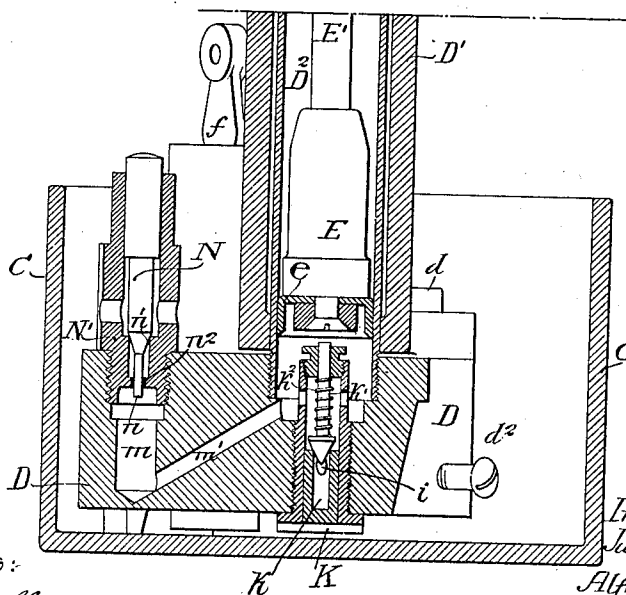


Fig. 4.



Witnesses:
Hiller P. Pullinger
Augustus B. Coppes

Inventors;
James Barker
Alfred Barker
Joseph P. Barker
by their Attorneys,
Norman Monahan

UNITED STATES PATENT OFFICE.

JAMES BARKER, ALFRED BARKER, AND JOSEPH P. BARKER, OF PHILADELPHIA,
PENNSYLVANIA.

HYDRAULIC ELEVATOR FOR CHAIRS.

No. 885,564.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed May 1, 1907. Serial No. 371,243.

To all whom it may concern:

Be it known that we, JAMES BARKER, ALFRED BARKER, and JOSEPH P. BARKER, citizens of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Hydraulic Elevators for Chairs, of which the following is a specification.

The object of our invention is to provide suitable mechanism for raising and lowering chairs of the type used by barbers or dentists, of such a nature that it can be readily operated by the foot either to raise or lower the body portion of the chair while being so arranged and constructed as to be readily removed from the base of the chair for the purposes of inspection and repair.

We further desire to provide hydraulic elevating mechanism for chairs of the type noted which shall be relatively simple in construction, not likely to get out of order, and convenient to operate.

In the accompanying drawings, Figure 1, is a vertical sectional view taken on the line 1—1, Fig. 3, of our improved hydraulic mechanism in position in the base of a barber's chair; Fig. 2, is a sectional view on the line 2—2, Fig. 3; Fig. 3, is a sectional plan view on the line 3—3, Fig. 1; Fig. 4, is a sectional elevation on the line 4—4, Fig. 3; Fig. 5, is a perspective view of the casing of the pump; Fig. 6, is a perspective view of the two-part cap; Fig. 7, is a diagrammatic view showing our invention applied to a chair, and Fig. 8, is a side elevation illustrating the means for connecting certain parts of our apparatus.

In the drawings, A is the base of a chair and A' is a cap plate having a bearing *a* through which extends the plunger B supporting the body portion B' of the chair, as clearly illustrated in Fig. 7. The chair may be of any type desired, either designed for use by barbers, dentists, or as an operating chair for surgeons.

In structures of this type it is desirable to provide means for raising and lowering the chair so as to bring the occupant thereof to a given height and such means must be so designed as to be readily operated by the foot to raise the chair and released without jar when it is desired to lower the chair.

The particular hydraulic mechanism hereafter described is so designed that it can be readily removed from the base of the chair

without the necessity of uncoupling any fastenings other than the levers which project through the casing, so that even a comparatively unskilled person can remove the pump mechanism, if it is out of order, and ship it to the factory, while similarly, a new pump may be inserted without trouble, as the apparatus is arranged to be interchangeable. Furthermore, the chair is so designed that it can be used even with the lifting mechanism removed, as its parts are so designed that under these conditions the plunger simply rests on the cap plate of the base.

Within the base we mount a casing or reservoir C for holding the liquid employed in the hydraulic apparatus and this casing has lugs *c* which rest upon an internal flange or projection *a'* of said base A; the casing C being arranged so as to be supported clear of the floor.

In the reservoir C is placed the base plate D of the hydraulic mechanism, which has secured to it a standard D' held in place by bolts *d—d*, extending through suitably placed lugs, as shown in Figs. 2 and 8. Tapped into an opening in the base plate D is a cylinder D² whose upper end is screw threaded so as to receive a suitably threaded cap *d'*, between which and the standard D' is a tubular section D³ having a projecting arm *d*³ hereafter noted. Therefore, the cylinder D² acts both as a cylinder for a piston E, and also serves to support the cap or nut *d'* by which the part D³ is held in place. Moreover, the cap *d'* is so constructed as to prevent the movement of the piston E out of the cylinder. Said piston E has a cupped washer *e*; turned down as indicated in Fig. 4, and is provided with a rod E' coupled to the main plunger B of the chair.

A pump cylinder F is screwed into an opening in the base plate D and in this cylinder is a plunger or piston F' connected by a rod *f* to a lever G pivoted at *g* and provided with oppositely disposed cup washers *f*³ and *f*⁴. The lever G is forked and pivotally attached to a projection *g'* on each side of the standard D', there being at each end of the fork beyond the pivot springs G' which are coupled to pins *d*² projecting from the base plate D. A foot lever *g*² is removably mounted in a socket *g*³ in the lever G and extends through an opening *a*² in the base A of the chair, being shaped as shown in Fig. 7 so as to be easily operated by the foot when it

is desired to raise said chair. It will be noted that the end of said foot lever has a projecting lug g^5 at its inner end, which fits a suitable recess in the socket so as to be normally retained in position while being easily removable by a slight upward and outward movement.

In the base plate D is a passage i communicating with the cylinders F and D^2 , as shown in Fig. 1, and we preferably provide a perforated plate f' in the bottom of the cylinder F for a purpose hereafter noted. A bushing I is screwed into the base D and has a central opening forming a communication between the liquid reservoir C and the passage i . Said bushing is constructed to provide a seat for a ball valve i' and the perforated plate f' of the cylinder is arranged so close to this ball that while the latter can move clear of its seat, it cannot be displaced. A second bushing K is screwed into the base plate D directly in line with the cylinder D^2 and is provided with a valve seat k , for the reception of a valve normally held down by a spring k^2 . Openings in this bushing communicate with the passage i and with the interior of the cylinder D^2 . Also screwed into an opening in the base plate D is a bushing or valve casing N' in which is a valve N having an elongated stem or reduced portion n and a beveled portion n' which is adapted to a seat in a valve casing. The opening n^2 in the valve casing is somewhat larger in diameter than the reduced portion n of the stem so that when the valve is unseated only a definite and predetermined flow can take place. The valve casing N' connects with a chamber m and through this with a passage m' leading to the base of the cylinder D^2 .

Pivoted at s so the standard D' is a lever S having a socket for a treadle arm s' extending through an opening in the structure A in close proximity to the foot lever g^2 and having a bearing on said structure, as indicated in Fig. 2. The end of said arm extends under the lever S, which is arranged to press upon the valve stem N, while being easily removable from the casing. A spring S' is mounted between the lever S and the arm d^3 on the cylindrical section D^3 above the standard D' and tends to normally hold the valve N closed upon its seat. The arm d^3 has a rod d^4 which passes through and guides this spring; there being on this rod a nut d^5 , which can be adjusted to regulate the compression of said spring. A set screw d^6 on the arm d^3 acts to limit the upward movement of the lever G.

Normally the piston F' of the pump cylinder F is maintained in its raised position by the springs G' , and when, after being forced down by the action of the foot on the foot lever g^2 , it is permitted to return to its upper position, a quantity of liquid is drawn past the valve i' into said cylinder from the reser-

voir C. If, now, the foot lever be again depressed the valve i' closes and the liquid forced from the cylinder F lifts the valve k' , passing through the passage i and into the cylinder D^2 , where it raises the piston E and with it the plunger B carrying the chair body. Upon the release of the foot lever it is again returned to its elevated position by the springs G' so that it will be understood that by a series of strokes of the said lever the chair body can be raised to any desired height.

When it is desired to lower the chair the outer end of the arm s' is depressed, thereby lifting the lever S against the action of the spring S' so as to leave the valve N free to be opened by the pressure of fluid in the cylinder D^2 . The plunger will then be lowered at a rate depending on the amount of liquid flowing through the passage n^2 and since this passage is relatively small, such lowering is gradual and without any shock. It is to be noted that the extension n of the valve N is particularly useful in keeping clear this small passage n^2 , which would otherwise be very liable to obstruction from solid bodies in the liquid.

We preferably close the upper portion of the casing C with a double cover plate C' and C^2 , as shown in Fig. 6, although any suitable covering may be used. By this arrangement one of the sections of said plate may be removed, without interfering with any of the mechanism, in order to permit of the addition or removal of oil, which is the liquid preferably used.

It will be noted that the above described mechanism is comparatively simple in construction and can be taken bodily out of the chair inasmuch as the levers are both removable by hand and the reservoir C with the entire mechanism is in no way positively fastened to the chair base A. When it is desired to make any repairs, the reservoir can be simply tilted so as to discharge the oil and the entire mechanism can be shipped as a unit to the shop while another complete apparatus can be supplied without delay to take its place.

From the above description it will be seen that we have overcome one of the great troubles hitherto inherent in chairs having hydraulic mechanism, viz., the liability of the mechanism to get out of order, for by reason of its simplicity our improved apparatus requires but little attention or repair. When it is desirable to inspect the mechanism, this may be conveniently done with but little trouble and without delay.

Furthermore, our improved mechanism besides being simple in construction, is not liable to become clogged; and is so arranged that it acts with the least amount of jar to the occupant of the chair either in raising or lowering it. Moreover, by the use of op-

positely disposed cup washers f^3 and f^4 in the pump, we avoid the possibility of air being drawn into the cylinder F, which would seriously interfere with the operation of the apparatus. Again, it will be noted that the base plate D is held to the bottom of the reservoir C merely by a single bolt c' , so that it is not only easily removable, but also permits of a construction of such a nature as to be conveniently finished on a turret lathe.

We claim:

1. The combination with the base of a chair, of a reservoir mounted in said base, a base section within the reservoir, a main cylinder projecting from the base section, a plunger within the main cylinder supporting the body of the chair, a pump cylinder at one side of the main cylinder and having a valved passage communicating with the reservoir, a piston within the cylinder, a socket connected to the piston and terminating within the chair base, an operating lever extending through an opening in the base and removably fitting said socket, said base section having a passage leading from the pump cylinder to the main cylinder, a valve in said passage, and means for allowing the liquid to escape from the main cylinder to the reservoir, substantially as described.

2. The combination of a reservoir, a base plate mounted within the reservoir, a main cylinder projecting from the base plate, a piston within the main cylinder and arranged to support the body of the chair, a pump cylinder at one side of the main cylinder, a piston therein, there being a passage in the base-plate leading from the pump cylinder to the main cylinder, and a passage from the reservoir to the pump cylinder, a valve in the first passage opening towards the main cylinder, a valve in the second passage, means for operating the piston in the pump cylinder, there being a valved outlet communicating with the main cylinder and with the reservoir, and means for operating at will the valve in said outlet, said valve and piston operating means respectively consisting of two sockets and two arms movably fitted to said socket, substantially as described.

3. The combination in elevating means for chairs, of a reservoir mounted in the base of a chair, a base plate mounted within the reservoir and secured thereto, a pump cylinder mounted on the base plate, a piston in said cylinder, a main cylinder, a plunger in said main cylinder, a rod projecting from the plunger and adapted to support a chair body, said base plate having a valved passage leading from the pump cylinder to the main cylinder, and a passage leading from the reservoir to the first mentioned passage, a valve in said second passage opening towards the pump, a socket within the base of the chair connected to the pump piston, a lever arm extending into the base and movably fitting said socket,

the base plate also having a passage leading from the main cylinder to the reservoir, a valve in said passage, means for normally holding said valve closed, and a lever for controlling the valve, with an operating arm extending into the base and removably engaging said valve, substantially as described.

4. The combination of a chair base having an internal flange, a removable reservoir having lugs resting on the flange to hold it in position, hydraulic mechanism mounted within the reservoir, a lever projecting into the base, and removably engaging said hydraulic mechanism for actuating the pump thereof, a cylinder having a plunger carrying the chair body, and means for operatively connecting the cylinder and the hydraulic mechanism, substantially as described.

5. The combination of a base, an internal flange thereon, a reservoir mounted within the flange and having external lugs resting on the flange, a base plate mounted within the reservoir, a main cylinder projecting from the base, a main piston in said cylinder and supporting the body of the chair, a pump cylinder at one side of the main cylinder, a piston thereon, said base having a passage leading from the pump cylinder to the main cylinder and communicating with the reservoir, two valves in said passage, and an operating lever connected to the pump piston and provided with a socket, with an operating arm extending through the base of the chair, and removably fitting said socket, substantially as described.

6. The combination of a structure to be elevated, hydraulic mechanism arranged to elevate said structure and including a cylinder, a piston in the cylinder, and a source of fluid under pressure connected to the cylinder, said cylinder being connected to a supporting structure at one of its ends and having a nut on its opposite end, with a cylindrical structure surrounding said cylinder and held in position by said nut, substantially as described.

7. The combination of a structure to be elevated, hydraulic mechanism arranged to elevate said structure and including a cylinder, a piston in the cylinder, and a source of fluid under pressure connected to the cylinder, said cylinder being connected to a supporting structure at one of its ends and having a nut on its opposite end connected to limit the movement of the piston, with a structure held in place by said nut and means for operating said hydraulic mechanism carried on said structure, substantially as described.

8. The combination of a structure to be elevated, hydraulic mechanism arranged to elevate said structure and including a cylinder, a piston in the cylinder, and a source of fluid under pressure connected to the cylinder, said cylinder being connected to a supporting structure at one of its ends and hav-

ing a nut on its opposite end, with a structure confined between said support and the nut, and an operating lever for the hydraulic mechanism mounted on said structure, substantially as described.

9. The combination of a supporting structure, a pump, a cylinder screwed in said supporting structure and communicating with the pump, a nut on the opposite end of said cylinder, a cylindrical structure confined between the cylinder and the supporting structure, a plunger in the cylinder, a structure to be elevated operatively connected to said plunger, and means mounted on the cylindrical structure for actuating the pump, substantially as described.

10. The combination of a supporting structure, a pump, a cylinder screwed in the said supporting structure and communicating with the pump, a nut on the opposite end of said cylinder, a cylindrical structure confined between the nut and the supporting structure, a plunger in the cylinder, a structure to be elevated operatively connected to said plunger, means mounted on the cylindrical structure for actuating the pump, and other means, also mounted on said structure, for controlling the escape of liquid from the cylinder, substantially as described.

11. The combination of a cylinder, a piston therein, a device to be elevated connected to the piston, a structure connected to said cylinder and having a plurality of passages, a pump mounted on said structure and connected through one of said passages to the cylinder, a reservoir, a ball valve in a passage between the pump and the reservoir, a check valve in a passage between the pump and the cylinder, and a valve operative at will normally closing a passage between the cylinder and the reservoir, with means for

controlling said valve including a spring-actuated lever having a socket and a second lever having one of its arms removably fitted to said socket, substantially as described.

12. The combination of a chair having a base, mechanism in said base for elevating said chair at will and levers for controlling the operation of said mechanism, said levers extending into the base and being operatively connected to the mechanism, but being removable therefrom and from said mechanism when their outer ends are elevated and pulled outwardly, substantially as described.

13. The combination of a chair having a base, mechanism in said base for elevating said chair at will, and means for controlling the operation of said mechanism, said means including a lever fulcrumed on the base but removably passing into the same and engaging the elevating mechanism, substantially as described.

14. The combination of a chair having a hollow base provided with a flange extending inwardly from its lower portion, a reservoir in said base removably hung from said flange, a base plate removably mounted in said reservoir, a piston connected to the chair, a cylinder therefor, a pump for forcing liquid to the cylinder, and means for controlling the operation of the pump, substantially as described.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

JAMES BARKER.
ALFRED BARKER.
JOSEPH P. BARKER.

Witnesses:

JOS. H. KLEIN,
WM. A. BARR.