

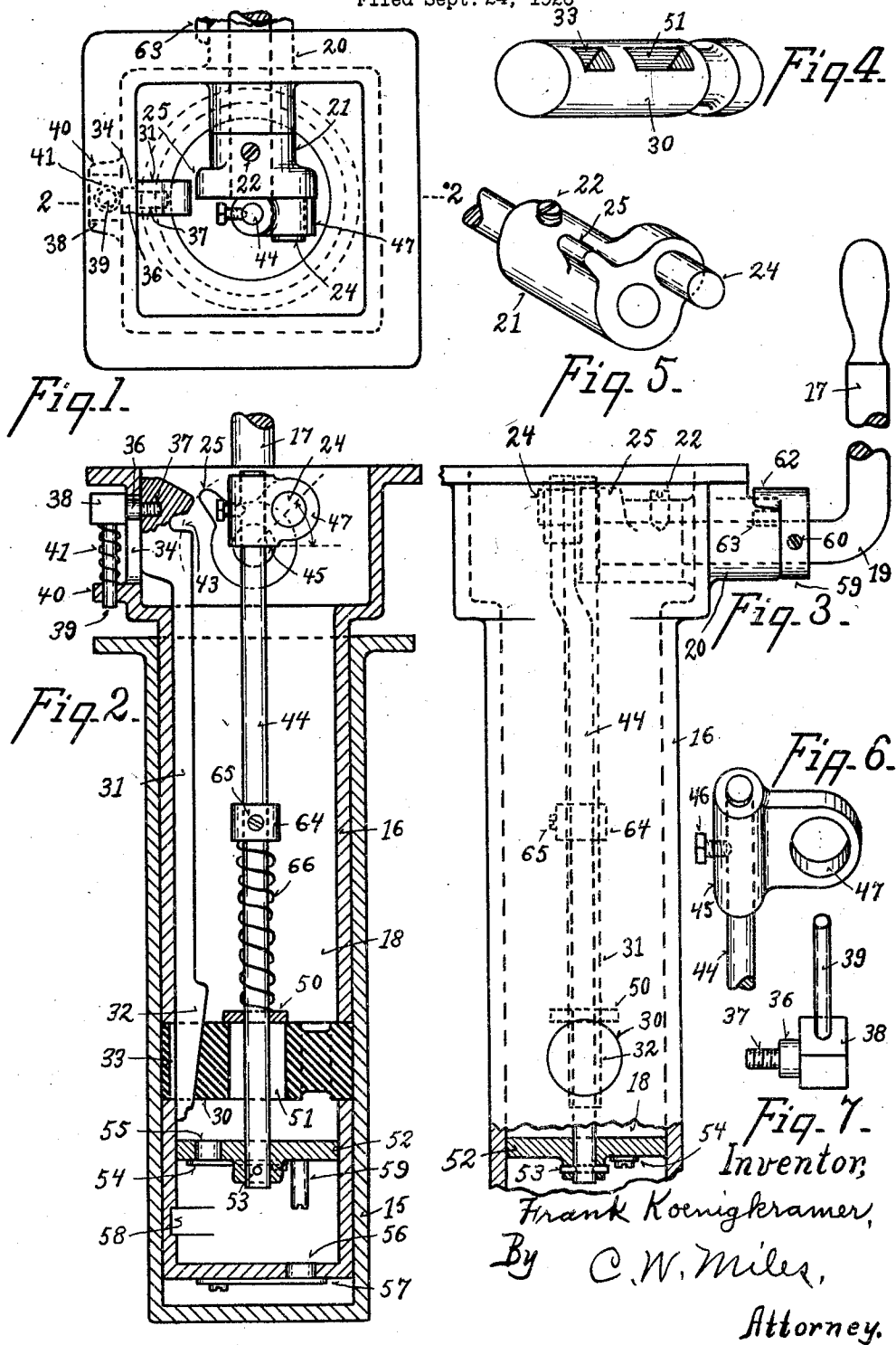
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HYDRAULIC LIFT

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HYDRAULIC LIFT.

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My invention relates to improvements in hydraulic lift adapted for use on barber and dental chairs, and for similar purposes. One of its objects is to provide improved actuating mechanism in which the actuating lever is automatically returned to a uniform position after it has been released by the operator, and whereby the operator knows the position of the lever and is enabled to grasp it without looking for it.

Another object is to provide an improved actuating mechanism in which the actuating lever is resiliently energized to move upwardly so that upon the operator reciprocally actuating the lever to elevate the plunger, it is only necessary for him to successively depress the lever, allowing the lever to be automatically and resiliently moved in the opposite direction or upwardly. Another object is to provide, in connection with the actuating mechanism, improved locking means which is resiliently energized to automatically unlock the plunger from its cylinder and to restore and hold the locking member uniformly, automatically, and reliably in its initial or idle position ready to be put into operation when required.

My invention also comprises certain details of form and arrangement, and combination of components, all of which will be fully set forth in the description of the accompanying drawings, in which:

Fig. 1 is a plan view of a hydraulic lifting apparatus embodying my improvements.

Fig. 2 is a central vertical section through the same, taken on line 2—2 of Fig. 1.

Fig. 3 is a side elevation of the plunger detached from the cylinder.

Fig. 4 is a perspective view of the locking shoe detached.

Fig. 5 is a perspective detail of a portion of the plunger and locking bar actuating mechanism detached.

Fig. 6 is a perspective view of the upper end of the plunger rod.

Fig. 7 is a perspective view of a bolt employed to resiliently return the locking bar to initial or idle position.

The accompanying drawings illustrate the preferred embodiment of my invention in which 15 represents the cylinder of a hydraulic lift, and is adapted to be mounted rigidly upon the base of a barber chair for instance while the plunger 16 is supported within the cylinder and is vertically adjustable relative to the cylinder by manually

actuating a lever 17, whereby a fluid is adapted to be forced from a reservoir 18 within the plunger into the space between the end of the plunger and the end of the cylinder, or returned from the space between the end of the plunger and the end of the cylinder, into said reservoir, depending upon the position and manner of actuating the lever 17.

The actuating lever 17 is bent at right angles at 19 near the upper end of the plunger and the horizontal section thereof is journaled in a bearing 20 formed in the upper end of the plunger. Inside of the bearing 20 is a head 21 which is rigidly attached to the inner end of the lever 17 by means of a set screw 22. The head 21 is provided with a crank pin 24 by means of which the pump plunger may be reciprocated and with a projection or tooth 25 which is adapted to engage a recess in the upper end of a locking bar to positively lock the plunger to its adjusted position relative to the cylinder.

The side walls of the plunger are perforated to receive and support a cylindrical locking shoe 30 which is adapted to be thrust endwise against the inner face of the cylinder wall so as to rigidly and frictionally or mechanically lock the plunger in place relative to the cylinder at any desired position of adjustment. This is effected by means of a locking bar 31 which extends downwardly along the inside of the plunger wall and at its lower end is provided with a tapered or wedge shaped section 32 which extends through a perforation 33 in the locking shoe so that when the locking bar 31 is thrust downwardly this wedge-shaped section is forced between the inner wall of the plunger and the inner end of the recess 33 and forces the shoe 30 in a right hand direction with its right hand end in frictional engagement with the inner wall of the cylinder, and the plunger and cylinder locked together. At the upper end of the plunger is a slot 34 through which projects the shank of a bolt 36 the inner end 37 of which is threaded into a recess in the upper end of the locking bar 31. The head 38 of the bolt 36 is provided with a downwardly directed cylindrical projection 39, the lower end of which passes through and is laterally supported by a perforation through a projection 40 extending outwardly from the upper end of the plunger. A

coiled spring 41 is mounted upon the rod 39 between the head 38 and the projection 40 and serves to automatically lift the bar 31, and retract it from locking engagement 5 with the shoe 30, and to normally hold the bar 31 in its initial or idle position. The initial or idle position of the lever 17 is substantially vertical as shown in Figs. 2 and 3. When lever 17 is shifted toward the left hand in Fig. 2, the tooth 25 comes into 10 engagement with the lower face of a recess 43 in the upper end of the bar 31 and serves to thrust the bar 31 downwardly and lock the plunger and cylinder together retaining the tooth 25 in the recess 43. When the 15 operator wishes to unlock the plunger from the cylinder he restores the lever 17 to its initial or vertical position which results in the tooth 25 engaging the upper wall of the recess 43 and lifting the bar 31 sufficiently to release the tooth 25 from recess 43, and to thereby release the shoe 30 from the cylinder wall. The spring 41 completes and 20 insures the return and holding of the bar 31 in its initial or idle position until again required to lock the plunger to the cylinder.

At the upper end of the pump rod 44, is a head 45 which is rigidly attached by a set screw 46 to the end of the pump rod, and 30 which is provided with a journal bearing 47 to engage the crank pin 24 by means of which the pump rod may be reciprocated endwise through a reciprocal movement of the lever 17, preferably by moving the lever 35 17 for a short distance in a right hand direction from the vertical position shown in Fig. 2 to nearly a horizontal position. The pump rod passes loosely through a washer or collar 50 resting upon and above the locking shoe 30, and through a perforation 51 in the shoe 30. At the lower end of the 40 pump rod and below the shoe 30 a pump piston 52 is rigidly attached to the pump rod by a pin 53. The pump piston is provided with a spring actuated pump valve 45 54 serving to close a port 55 through the pump piston, and which valve and port are arranged so as to automatically feed the fluid in the interior of the plunger downwardly past the pump piston when the 50 pump piston is reciprocated within prescribed limits. A port 56 through the bottom of the plunger 16 and a spring actuated valve 57 provide for the fluid being 55 forced by the pump piston through the port 56 into the space between the lower end of the plunger and the lower end of the cylinder to thereby elevate the plunger relative to the cylinder. When it is desired to 60 lower the plunger relative to the cylinder the handle of the lever 17 is depressed toward the right hand in Fig. 2 to a still further degree than that employed for pumping purposes, say below a horizontal 65 position, which results in bringing the

pump piston to a position of rest opposite a by-pass port 58, and at the same time causes the projection 59 carried by the pump piston to engage and hold the valve 57 open thereby permitting the fluid to flow slowly 70 upwardly past the valve 57 and through the by-pass port 58 past the piston into the upper portion of the interior of the plunger 17 and allowing the plunger to move downwardly relative to the cylinder. 75

Outside of the plunger bearing 20 is a collar 59 rigidly held to its adjusted position upon the lever 17 by means of a set screw 60. The collar 59 prevents play of the lever 17 endwise in the bearing 20. The collar 59 is provided with a projection 62 which 80 overhangs the bearing 20 and is in a position to engage a projection 63 extending outwardly from the bearing 20 to limit the movement of the lever 17 and prevent the locking bar 31 being unduly forced into engagement with the shoe 30. Mounted upon 85 the pump rod 44 is a collar 64 held rigidly in place thereon by a set screw 65. A coiled spring 66 is interposed between the collar 64 and the collar 50, which serves to automatically lift the pump rod 44 and to return the hand lever 17 to a vertical position, which is its initial or idle position, and to 90 retain the hand lever 17 in this position until again required for use. Thus the operator knows exactly where to find the lever when required without having to look for it, and is enabled to release the lever in any position knowing that it will automatically 95 return to its initial position. 100

The spring 41 and bolt 36 serve to guide the bar 31 and to return the locking bar 31 to its elevated position as shown in Fig. 2 as soon as the lever 17 has returned to its initial position, thereby entirely releasing the bar 31 from locking relation to the shoe 30 and placing the recess 43 of the bar 31 in position to be engaged by the tooth 25 with 105 certainty and reliability. 110

A chair seat, back, arms and foot rest are adapted to be attached to the upper end of the plunger and to be vertically adjusted therewith.

The apparatus herein shown and described 115 is capable of considerable modification within the scope of the claims without departing from the spirit of my invention.

What I claim is:

1. A hydraulic lift comprising a cylinder, 120 a plunger mounted therein to move vertically within the cylinder, a locking shoe supported near opposite ends in bearings carried by said plunger and adapted to move endwise into and out of engagement with 125 the inner face of said cylinder to frictionally engage and lock said plunger to said cylinder; a locking bar having a tapered section to engage said shoe and force the shoe into engagement with the cylinder wall, means 130

acting resiliently to return said locking bar to its initial idle position, a pump piston located in said plunger and adapted to force a liquid from the interior of said plunger into the space between the bottom of said plunger and the bottom of said cylinder.

2. A hydraulic lift comprising a cylinder, a plunger mounted therein to move vertically within the cylinder, a locking shoe supported near opposite ends in bearings carried by said plunger and adapted to move endwise into and out of engagement with the inner face of said cylinder to frictionally engage and lock said plunger to said cylinder, a locking bar having a tapered section to engage said shoe and force the shoe into engagement with the cylinder wall, means acting resiliently to return said locking bar to its initial idle position, a pump piston located in said plunger and adapted to force a liquid from the interior of said plunger into the space between the bottom of said plunger and the bottom of said cylinder, a piston rod passing through a perforation in said shoe and connected at one end to said piston and at its opposite end to

the crank pin of an actuating lever, a collar rigid upon said piston rod, a collar loose upon said piston rod and resting upon said shoe, and a spring interposed between said collars to resiliently act upon said piston rod and actuating lever to return them automatically to a predetermined idle position.

3. A hydraulic lift comprising a cylinder, a plunger mounted therein to move vertically within the cylinder, a piston located within said plunger, and adapted to force a liquid from the interior of said plunger into the space between said plunger and the bottom of said cylinder, an actuating lever journaled to said plunger and provided with a crank pin to actuate said piston, a piston rod connected at its lower end to said piston and at its upper end to the crank pin of said actuating lever, and a spring acting resiliently upon said piston rod and actuating lever to automatically hold said piston rod and actuating lever in a predetermined idle position.

In testimony whereof I have affixed my signature.

FRANK KOENIGKRAMER.