

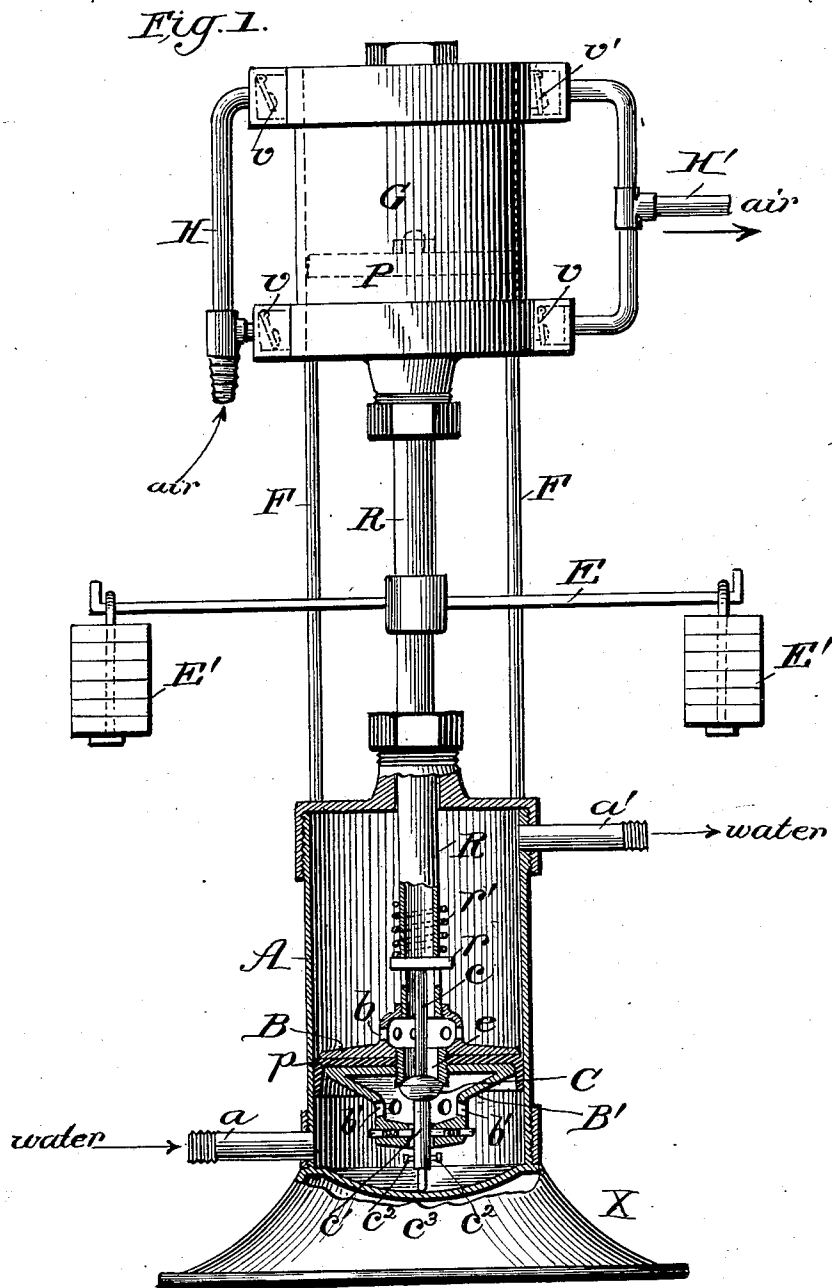
No. 728,651.

PATENTED MAY 19, 1903.

R. D. ALBRIGHT.
AIR PUMP OPERATING DEVICE.
APPLICATION FILED SEPT. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:
Jos. A. Ryan
Edw. W. Ryan

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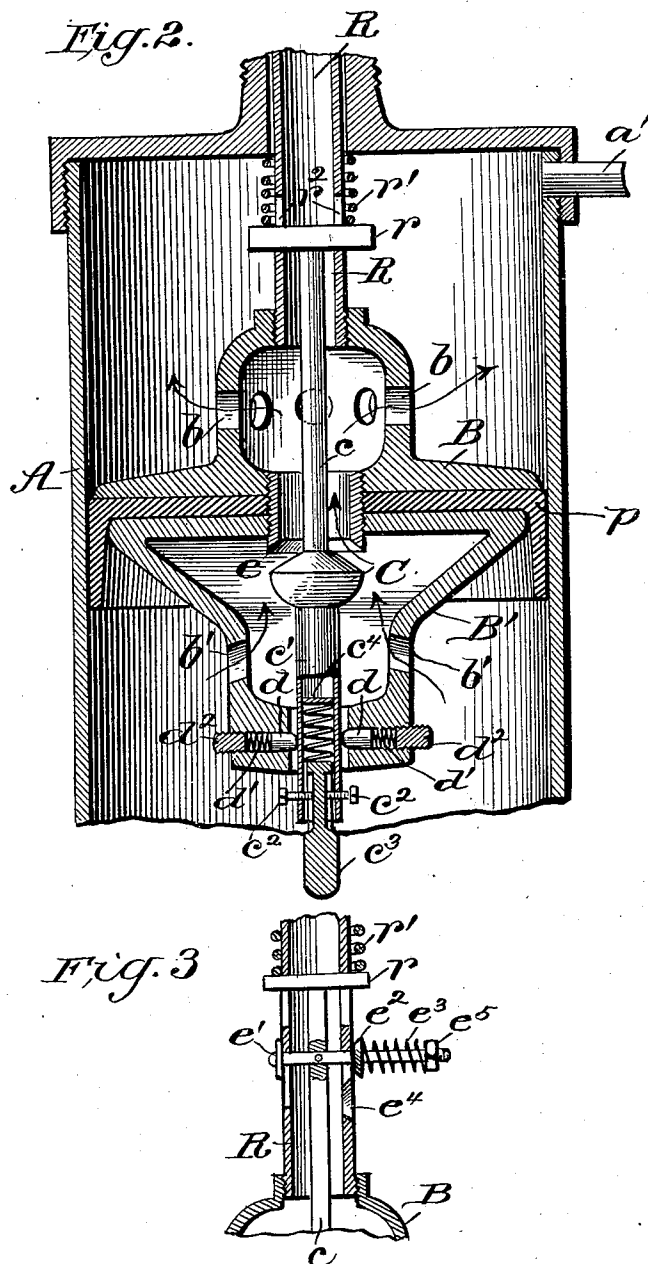
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UNITED STATES PATENT OFFICE.

RALPH D. ALBRIGHT, OF REYNOLDSVILLE, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO DELOS E. HIBNER, OF DUBOIS, PENNSYLVANIA.

AIR-PUMP-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 728,651, dated May 19, 1903.

Application filed September 27, 1902. Serial No. 125,093. (No model.)

To all whom it may concern:

Be it known that I, RALPH D. ALBRIGHT, of Reynoldsville, in the county of Jefferson and State of Pennsylvania, have invented a new and useful Improvement in Air-Pump-Operating Devices, of which the following is a specification.

My invention is in the nature of an air-pump designed to be operated automatically by the movement of water through the water-pipes of a building as water is drawn from time to time through the various outlet fixtures of the building, such as the urinals, water-closets, sinks, washstands, &c. The apparatus is to be located preferably at the point where the street-supply comes in the building, so that all the water issuing through the outlets of the building will actuate the apparatus and compress air in a tank to be used for maintaining a pressure on the surface of beer in the barrels of restaurants and bars in hotels, or for purposes of ventilation, or for any other purpose, the apparatus working whenever water is drawn and stopping when the flow of water ceases, and the air-pressure in the tank to be regulated by safety-valves or blow-off appliances at any desired pressure.

My invention consists in the novel construction and arrangement of the apparatus, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a side elevation of the apparatus with the water-cylinder, its piston, and valve in section. Fig. 2 is an enlarged sectional detail of the piston and valve, and Fig. 3 a sectional detail of an additional valve-restraining device.

In the drawings, Fig. 1, A represents an upright cylinder, mounted upon any suitable base X and having a water-inlet pipe *a* at the bottom to connect with the water-mains of the street and an outlet water-pipe *a'* near the top to connect with the service-pipes of the building and the various outlets of the building, such as exist at the urinals, water-closets, sinks, washstands, street-washers, &c.

B B' are the two parts of a piston, clamping between them a flexible packing-disk *p*, which fits the inner bore of the cylinder with a water-tight joint. The upper piston-section B has an enlarged hollow hub having

holes *b* through it, and the lower section B' of the piston has also an enlarged hollow hub having holes *b'* through it. The upper and lower sections of the hub are concentrically connected by a screw-sleeve *e*, which forms a passage-way from the hollow hub of the lower piston-section B' to the hollow hub of the upper piston-section B.

C is a valve seating upwardly against the lower edge of the central sleeve *e* and having an upwardly-projecting stem *c*, that rises through the sleeve *e* and into the hollow piston-rod R, and having also a downwardly-projecting hollow stem *c'*, which projects through a central opening in the lower section of the hollow hub. Where this hollow stem passes through the lower section of the hollow hub, it is held with a frictional contact between two or more spring-seated pins *d d'*, arranged in chambers in the hub to move at right angles to the axis of the valve-stem. These spring-seated pins have their spiral springs *d'* restrained and adjusted as to tension by screw-plugs *d''*, so that the pins *d* may bear more or less strongly against the hollow valve-stem.

In the lower end of the hollow valve-stem there slides freely an impact-plug *c''*, which is slotted on the sides and retained in place against slipping out by set-screws *c'''* and is forced downwardly with a yielding pressure by a spiral spring *c'''* above it within the hollow valve-stem.

The upper extension of the valve-stem *c* enters the hollow piston-rod R and bears against a cross-pin *r*, which projects through slots in the sides of the hollow piston-rod and has above it a spiral spring *r'*, wound around the piston-rod.

To the piston-rod R (see Fig. 1) is rigidly attached a horizontal cross-bar E, carrying at its outer ends weights E', built up in sections and capable of being increased or diminished in weight by adding more sections or taking some off.

Mounted on the top of cylinder A are two or more vertical standards F F, which sustain at their upper ends a double-acting air-pump G, having its piston P secured to the piston-rod R of the water-cylinder below. This air-pump takes in air through a pipe H and inlet-valves *v v* and expels it, after being com-

pressed, through outlet-valves $v' v'$ and outlet-pipe H' to any suitable storage tank or reservoir for compressed air.

The operation of my apparatus is as follows:

- 5 The pipe a being connected with the water-mains of the street and a' with the house-pipes leading to the various outlet-fixtures, the apparatus is ready for automatic action. Whenever water is drawn through any of the house fixtures, pressure is reduced above the piston $B B'$, and the water coming in at city pressure through pipe a raises the piston as valve C is closed. When the piston reaches the end of its upward stroke, the spring r' strikes the upper cylinder-head and, acting on the cross-bar r and valve-rod c , forces the valve C down, opening it, as shown in Fig. 2. This valve is held in this open position by the frictional contact of the spring-seated pins $d d$. The weights E' , secured by cross-bar E to the piston-rod, now force the piston down from their gravity, and the water beneath the piston passes through the holes b' and b to the upper side thereof, the valve being kept from closing from the upward rush of water by the restraining action of the spring-seated pins d on the lower end of the valve-stem. When the piston nears the end of the downward stroke, the impact-piece c^3 strikes the lower head of the cylinder with a cushioned blow and forces the valve C up against the lower end of sleeve e , where it is held closed both by the pressure of the water and the action of the spring-seated pins d . The piston now again rises from the pressure of water below and lifts the weights E' to their highest position again. When this occurs, the valve C is again opened by contact of spring r' against the upper cylinder-head, as before, and the weights again bring down the piston. In this way as long as any water is being discharged through any one or more of the outlets of the house the piston $B B'$ is kept reciprocating, and as it is connected by the rod R with the plunger P of the air-compressor G it will be seen that it furnishes a simple and automatic means for working the air-pump and storing up air under pressure for any purpose for which it may be required.
- 50 To regulate the motion of the piston, the weights E' are made in sections, and more or less of them may be added, as may be required.

- As a means for holding the valve down in an open position against the upward rise of water, I may employ not only a frictional retardation for the valve, but may employ a positive lock for the same, as shown in Fig. 3. In such case the valve-stem c has rigidly attached to it a cross-pin e' , sliding in slots in the hollow piston-rod, and on this cross-pin is a spring-seated washer or plug e^2 , having a spiral spring e^3 behind it, retained in place with an adjustable tension by a nut e^5 .
- 65 In the side of the hollow piston-rod, in vertical line with this washer or plug, is a locking-seat e^4 , into which the washer or plug e^2

drops and is locked whenever the valve-stem is forced down to open the valve. This positive lock is released again by the upward thrust on the valve-stem, due to the contact of its lower slip-section c^3 with the lower cylinder-head, the plug e^2 rising out of its locking-seat e^4 by reason of the yielding of the spring e^3 behind the plug.

As shown, the air-pump is located above the water-cylinder; but it is obvious that their positions may be reversed without departing from my invention.

In pointing out the distinguishing features of my invention more clearly I would state that by detaching and separating the air and water cylinders in vertical alinement and attaching the weights to the common piston-rod at a point externally to the two cylinders and between the same marked advantages are obtained in that it makes the weights accessible, so that their sections may be put on or taken off to adjust the apparatus to the varying water-pressures of different localities and altitudes, and, furthermore, a much more effective and positively-acting weight may be obtained than if the air-piston only constituted the weight, in which case the piston would not only be inaccessible and practically invariable in weight, but an excessively long and heavy piston would be required and an even greater length of air-cylinder. The external weights in my invention not only permit variation in the weights and adjustment to the pressure conditions of any locality, but allow the use of an ordinary thin piston in the air-pump and a minimum length of air-cylinder.

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

1. The combination of two vertically-alined and detached cylinders having a common piston-rod and independent pistons on the ends of said rod, one of said pistons having a water-passage through it, a valve controlling the same, adjustable weights and means for attaching them to the piston-rod between and externally to the two cylinders, and means for opening and closing the valve substantially as described.

2. The combination of two vertically-alined and detached cylinders having a common piston-rod and independent pistons on the ends of said rod, one of said pistons having a water-passage through it, and a valve controlling the same having upper and lower stem extensions with contact devices for striking the heads of the cylinder to shift the valve, and adjustable weights and means for attaching them to the piston-rod between and externally to the two cylinders substantially as and for the purpose described.

3. The combination of two vertically-alined and detached cylinders having a common piston-rod and independent pistons on the ends of said rod, one of said pistons having a water-passage through it, and a valve control-

ling the same having upper and lower stem extensions, an automatically-adjustable restraining device for holding the valve open against the pressure of the water, and adjustable weights and means for attaching them to the piston-rod between and externally to the cylinders to bring down the pistons substantially as and for the purpose described.

4. The combination of two vertically-alined and detached cylinders having a common piston-rod and independent pistons on the ends of said rod, one of said pistons having a water-passage through it and a valve controlling the same formed with an upper and lower stem extension, an automatically-adjustable locking device for holding the valve open against the pressure of water, and adjustable weights and means for attaching them to the piston-rod between and externally to the cylinders substantially as and for the purpose described.

5. The combination of two vertically-alined and detached cylinders having a common piston-rod bearing at an intermediate point a cross-bar with weights arranged between and externally to the cylinders, pistons on the ends of said rod, one of said pistons having a water-passage through it and a valve controlling the same formed with an upper and lower stem extension, and restraining devices for holding the valve open substantially as and for the purpose described.

6. The combination of two vertically-alined cylinders having a common piston-rod and independent pistons on the ends of said rod, one of said pistons having a water-passage through it and a central valve controlling the same, spring-seated impact devices for the upper and lower ends of the valve-stem for shifting the valve, restraining devices for holding the valve open, and a weight attached to the piston-rod between the cylinders substantially as described.

7. A hydraulic motor comprising a cylinder, a piston made in two parts each with a

hollow and perforated hub portion, a central sleeve connecting said parts and forming a water-passage and valve-seat, and a valve having upper and lower stems extending through the hollow hubs and having cushioned impact devices at the upper and lower ends for shifting the valve substantially as described.

8. A hydraulic motor comprising a cylinder, a piston made in two parts each with a hollow and perforated hub portion, a central sleeve connecting said parts and forming a water-passage and valve-seat, and a valve having an upper and lower stem extension with cushioned impact devices for shifting the valve, and restraining devices for holding the valve open substantially as and for the purpose described.

9. A hydraulic motor comprising a cylinder, a piston made in two parts each with a hollow and perforated hub portion, a central sleeve connecting said parts and forming a water passage-way and valve-seat, a valve having an upper and lower stem extension, a hollow piston-rod receiving the upper extension and having a transverse slot, a cross-bar in said slot resting upon the upper extension of the valve-stem, and a spiral spring resting above the cross-bar and wound about the hollow piston-rod substantially as and for the purpose described.

10. A hydraulic motor comprising a cylinder, a piston made in two parts, each with a hollow and perforated hub portion, a central sleeve connecting said parts and forming a water passage-way and a valve-seat, a valve having an upper and lower stem extension, and a restraining device arranged in the hub portion to bear against the valve-stem substantially as and for the purpose described.

RALPH D. ALBRIGHT.

Witnesses:

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G. J. CORWIN.