June 21, 1932. E. A. DAVIS 1,864,412

PUMP

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FIG. 1.

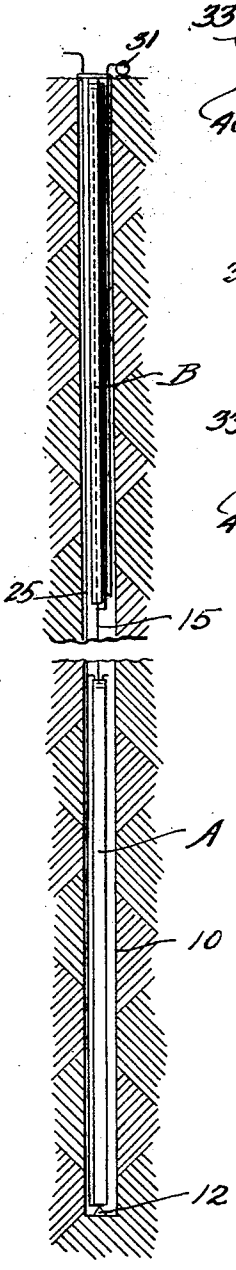


FIG. 4.

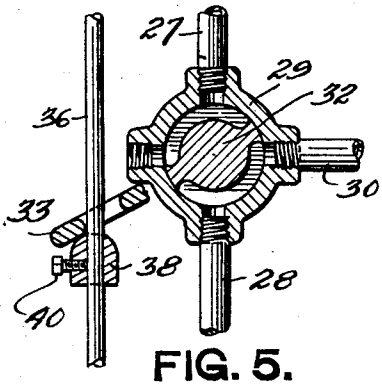


FIG. 6.

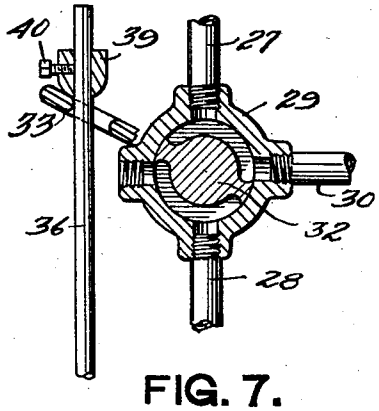


FIG. 5.

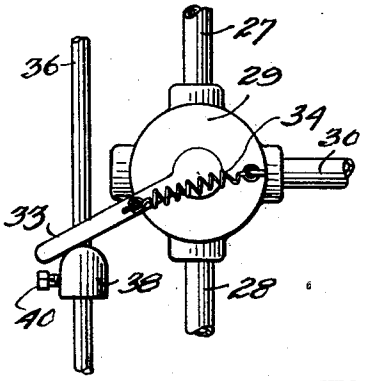


FIG. 7.

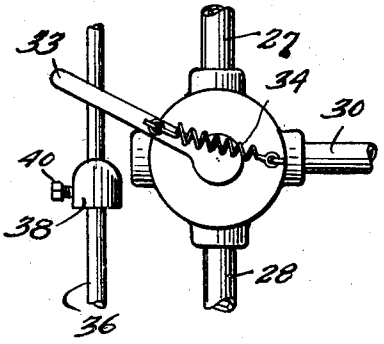
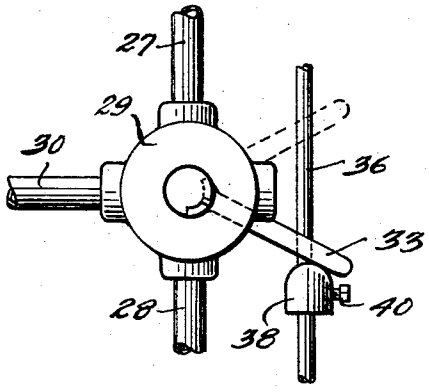


FIG. 8.



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FIG. 2.

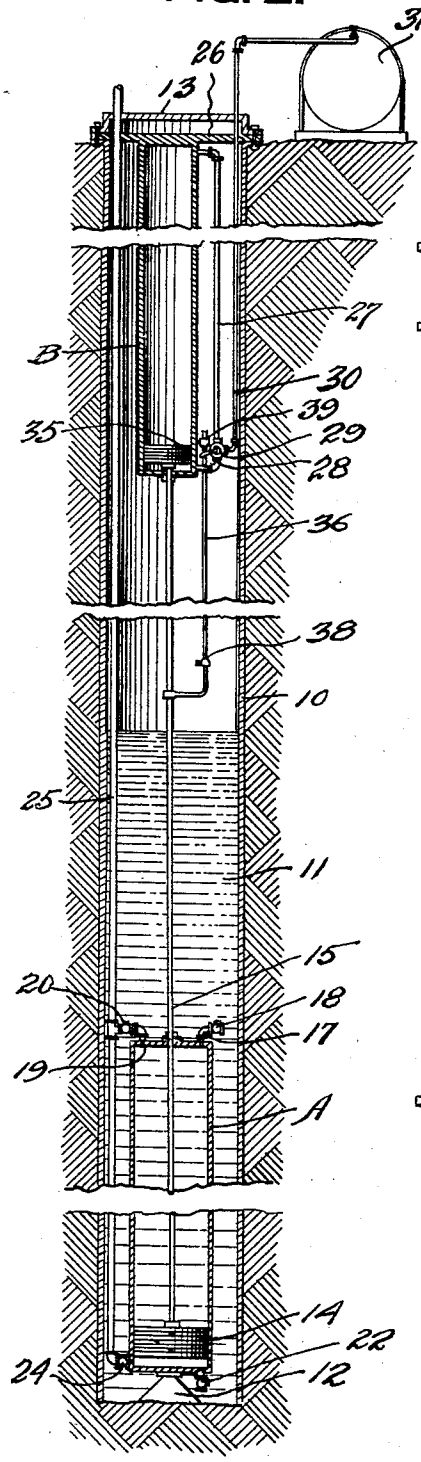
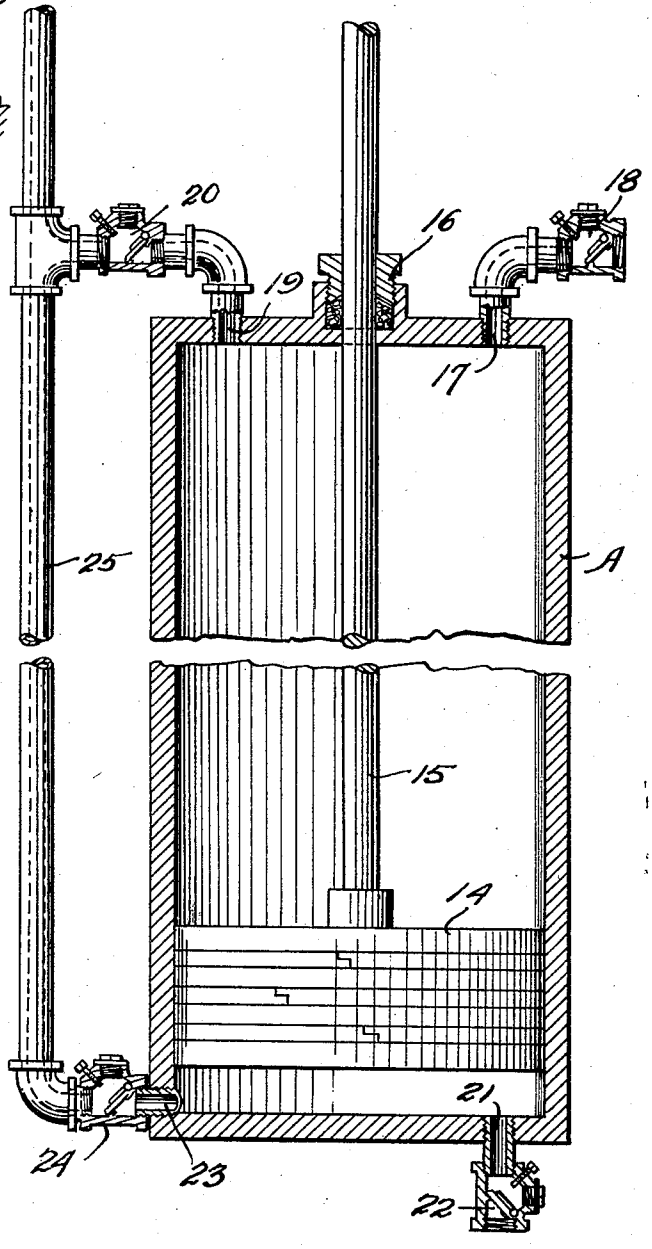


FIG. 3.



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UNITED STATES PATENT OFFICE

ELTON A. DAVIS, OF PADRONI, COLORADO

PUMP

Application filed September 29, 1930. Serial No. 485,198.

This invention relates to liquid pressure pumps, an object of the invention being to provide a continuous supply of liquid, such as water, under pressure. Another object is to provide a pump, which may be positioned in wells of any depth, and which will effectively deliver a continuous stream of liquid therefrom through a pipe line. Another object is to provide a pump, of the general character described, which will require only a small amount of power for its operation, this power being supplied either by a prime mover, or by hand. Another object is to provide a pump, which will be practically automatic in its operation, and which will be of such simple construction as to practically eliminate the possibility of its failing to properly function. Other objects may later become apparent.

In the accompanying drawings:

Figure 1 is a vertical sectional diagrammatic view of a liquid pressure pump, constructed in accordance with this invention, and applied to a well of liquid, this view being shown broken, to indicate that the parts are actually longer than shown.

Figure 2 is an enlarged detailed showing of Figure 1, this view also being broken.

Figure 3 is a view partly in elevation and partly in vertical section, of the submerged cylinder shown in Figure 2.

Figures 4 and 5 are respectively a vertical sectional view and a side elevation of the operating valve shown in Figure 2.

Figures 6 and 7 are views similar to Figures 4 and 5 respectively, the lever being shown thrown in another position.

Figure 8 is a side elevation of the reverse side of the valve shown by Figures 4 to 7.

In these drawings, similar numerals refer to similar parts throughout the several views.

The invention is characterized by the use of two cylinders, A and B, the cylinder A being positioned beneath the level of a liquid body and the cylinder B being positioned above this level.

As shown the cylinder A is positioned in a well casing 10, well beneath the level of the liquid body 11. This cylinder A may be positioned in any manner, a pedestal 12 being shown for illustrative purposes. The well casing 10 is shown provided with a casing head 13.

The cylinder A is shown provided with a reciprocable piston 14, having a piston rod 15 passing through a stuffing box 16 in the head of this cylinder. In the upper right hand side of the cylinder is an inlet 17 provided with an inward acting check valve 18, the opposite side of the top being provided with an outlet 19 having an outward acting check valve 20. The bottom of this cylinder also has an inlet 21 provided with an inward acting check valve 22, and an outlet 23 provided with an outward acting check valve 24. The outward acting check valves 20 and 24 are connected to a pipe 25, which extends up within the well casing, and out through the casing head 13.

The cylinder B is shown formed with a large outwardly extending flange 26, which is clamped between the casing head 13 and casing wall 10 so as to position the cylinder above the level of the body of liquid 11. A pipe line 27 is tapped into the upper part of this cylinder, and a shorter pipe line 28 is tapped to the bottom, a fourway valve 29 being interposed between these two pipes lines. This valve has a third pipe 30 connected to it, the other end of this pipe line being supplied with compressed air from a tank 31. This tank may be supplied with air by hand or motor driven pump in a conventional manner. The valve 29 is preferably of the rotary type containing a rotatable body 32, which is operated by an apertured lever 33. Preferably a spring 34 is connected to this lever, so that the valve will be very quick in action.

Within the cylinder B is a reciprocable piston 35, the piston rod 15 extending from the cylinder A being arranged in connection therewith, so that the pistons 35 and 14 will move simultaneously from one end of their respective cylinders to the other. A right angular bent rod 36, having stops 38 and 39 at opposite ends thereof, is fixed to the piston rod 15 so as to pass through the apertured handle 33 of the valve 29. Preferably the stops 38 and 39 are adjustably secured to the rod 36 by means of screw bolts 40.

The pump as shown is entirely automatic in operation. In Figure 2 the valve 29 is in the position shown in Figures 4 and 5. The rotatable body 32 in this valve is then in a position to permit air to feed to the bottom of the cylinder B, causing the piston 35 to rise, and to carry the piston 14 upwards. The compressed air, being of an elastic nature will continually keep the water contained in the cylinder A under pressure, so that as water is withdrawn from the pipe 25 from this cylinder, through its outlet 19 and valve 20, the piston 14 will be continually urged upward to maintain a state of pressure. As the piston 14 rises, the check valve 22 will open to permit water being sucked in through the inlet 21, the check valve 24 preventing the passage of water back through the outlet 23. As the piston 14 approaches the top of the cylinder, the stop 38 on the rod 36 will butt against the handle 33 of the valve 29, and slowly rise same against the compression of the spring 34 until it has passed a dead center, when this spring will snap the handle quickly to the upward position, thus releasing the compression from the bottom of the cylinder 13 through the free outlet of the valve, and at the same time introducing air under pressure to the top of the cylinder, through the pipe 27. This will force the piston 14 downward so as to displace water therefrom through the outlet 23 and valve 24, the valve 22 closing to prevent escape of water through it, and, at the same time, the valve 20 will close to prevent the escape of water from the pipe 25 at that point, while the valve 18 will open to permit the cylinder to intake water through the inlet 17. As long as water is drawn out through the pipe 25, this cycle of operation will continue, provided the air pressure in the tank 31 is maintained.

The pump described herein enables the production of a steady current of liquid from wells, no matter how deep they are. The construction is very simple and it is not necessary to employ a large amount of operating power, as is the case with so many pumping systems. It may advantageously be employed in rural communities where a complicated pumping system would be objectionable.

It is to be understood that the invention as here shown and described, is for illustrative purposes, only, and that the scope of the appended claim is not to be limited thereto, but that this claim is intended to be construed broadly.

I claim:

In a liquid pressure pump the combination of a cylinder provided with a plurality of inlets and outlets, means supporting the cylinder below the level of a liquid body, a second cylinder, means supporting the second cylinder in adjustable relation to the first cylinder and independently of the first mentioned means, a reciprocating piston in each cylinder, means for inter-connecting said pistons, and means for introducing an elastic fluid under pressure to said second cylinder.

ELTON A. DAVIS.