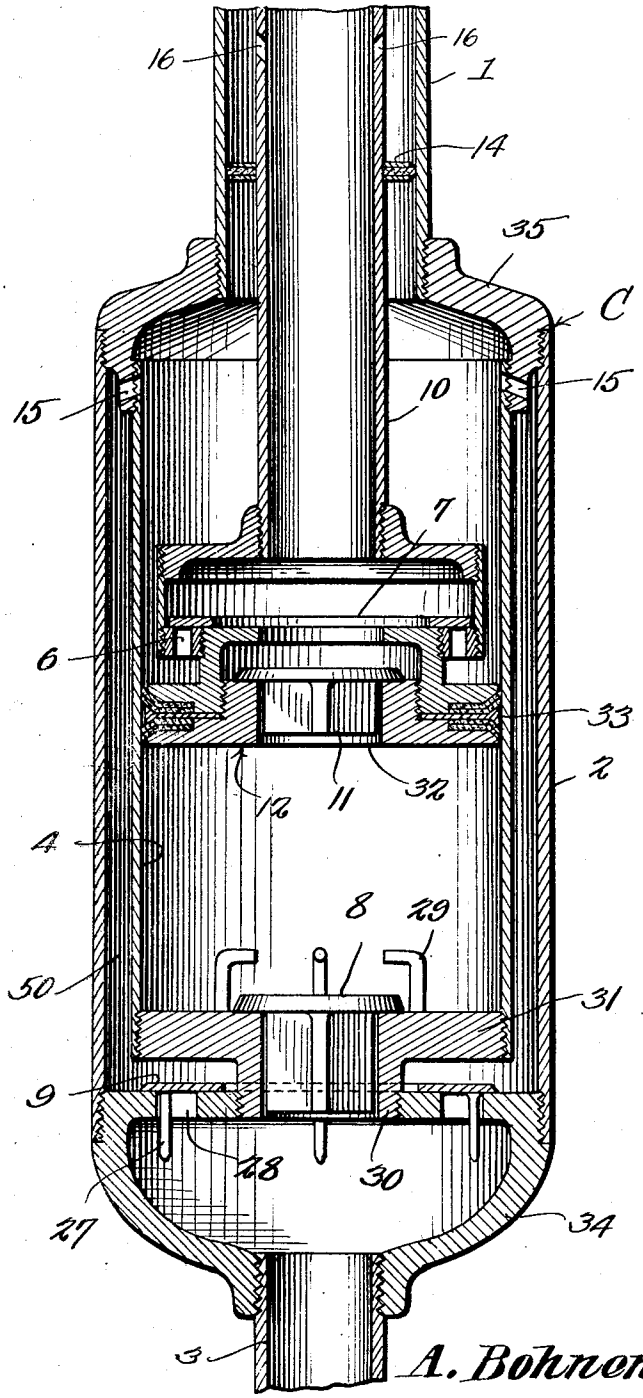
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CYLINDER PUMP

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A. Bohnenblust

Inventor

By C. A. Snow & Co.

Attorneys.

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ARNOLD BOHNENBLUST, OF RILEY, KANSAS

CYLINDER PUMP

Application filed April 1, 1929. Serial No. 351,630.

This invention has for its object, the provision of a pump capable of hoisting a large quantity of water without making a long stroke.

In the drawing, the invention is shown in a single figure which is a vertical longitudinal section.

The pump forming the subject matter of this application comprises a cylinder C including an upper member 1 and a lower member 2 connected by a cap 35. The lower end of the lower member 2 of the cylinder is mounted on a foot 34, an inlet pipe 3 being connected to the foot 34. The numeral 4 designates a barrel, located within the lower member 2 of the cylinder. The upper end of the barrel 4 is connected to the cap 35. There is a space 50 between the barrel 4 and the lower member 2 of the cylinder. In the cap 35 and in the upper end of the barrel 4 there are ports 15 communicating with the space 50 and with the upper end of the barrel 4. The numeral 10 designates a hollow piston rod movable longitudinally in the upper member 1 of the cylinder and in the barrel 4. The rod 10 carries a travelling packing member 14 which slides in the upper member 1 of the cylinder. The hollow piston rod 10 has ports 16 establishing communication between the interior of the rod 10 and the space between the upper member 1 of the cylinder and the hollow rod 10, above the member 14.

Numeral 12 marks a bottom piston carrying a packing 33 that fits closely in the barrel 4. The piston 12 has in its lower end a passage 32 which communicates with the space below the piston 12, in the barrel 4. The piston 12 has ports 6 which communicate with the space below the piston 12 and within the barrel 4. The ports 6 are controlled by a downwardly closing first check valve 7 of annular form. The passage 32 is controlled by a fourth check valve 11 that closes downwardly.

The barrel 4 includes a base 31 having a reduced extension 30 to which is threaded into the top of the foot 34, the extension 30 being of tubular form and establishing communication between the foot 34 and the lower end of the barrel 4. The extension 30 is controlled by a downwardly closing second check valve 8, the check valve 8 working beneath stops 29 on the base 31. In the top of the foot 34 there are ports 28 controlled by a downwardly closing third check valve 9, the check valve 9 having fingers 27 located in the ports 28.

On the down stroke of the piston rod 10, the second valve 8 closes, the fourth valve 11 opens, and liquid in the barrel 4 below the piston 12 moves through the passage 32 through the piston 12, into the hollow piston rod 10, and out of the ports 16 into the space within the upper part 1 of the cylinder C, above the member 14. As the bottom piston 12 moves downwardly, the first check valve 7 closes, and liquid is sucked from the space 50 through the ports 15 into the space within the barrel 4, above the bottom piston 12, and the suction thus created in the space 50 causes the third check valve 9 to open and admit liquid into the space 50, through the ports 28, from the foot 34 and the inlet 3.

On the upstroke of the piston rod 10, the third check valve 9 is in closed position. The second check valve 8 is in open position, the fourth check valve 11 is in closed position, and the first check valve 7 is opened as the water on top of the piston 12 is forced upwardly through the ports 6 into the interior of the piston 12, The bottom piston 12 sucks the liquid into the space 50 from the base 34 and from the inlet 3 through the ports 28. Because the fourth check valve 11 is closed, the liquid within the hollow piston 10 is hoisted. The liquid in the upper part 1 of the cylinder C, above the member 14, is raised also.

What is claimed is:—

A pump including a cylinder having an outlet in its upper end, a foot for the cylinder and provided with a plurality of ports arranged in annular form in its top, a barrel connected at its upper end to the cylinder, a base for the barrel and having a reduced tubular extension mounted on the foot, an annular, washer-like check valve disposed about the extension and controlling the ports, said valve being movable between the foot

and the base of the barrel, said base constituting a stop limiting the upward movement of the valve, means for establishing communication between the upper end of the barrel and the upper end of the cylinder, a hollow piston rod in the outlet of the cylinder and in the barrel, a piston carried by the rod and slidable in the barrel, the piston having upper and lower chambers, the upper chamber being in communication with the hollow piston rod, and the lower chamber being in communication with the lower part of the barrel, the upper chamber being of greater diameter than the lower chamber, whereby ports can be formed in the lower end of the upper chamber, about the lower chamber, said ports communicating with the upper chamber and with the barrel, above the piston, a downwardly-closing check valve in the lower chamber and controlling backflow from the lower chamber into the barrel, below the piston, and a downwardly-closing, annular, washer-like check valve in the upper chamber and controlling the said ports in the lower end of the upper chamber, the last-specified check valve being held in place over the ports in the lower end of the second chamber by the side wall of said chamber, the annular form of the last-specified check valve permitting liquid to pass through it from the lower chamber into the upper chamber and to the outlet.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

ARNOLD BOHNENBLUST.