

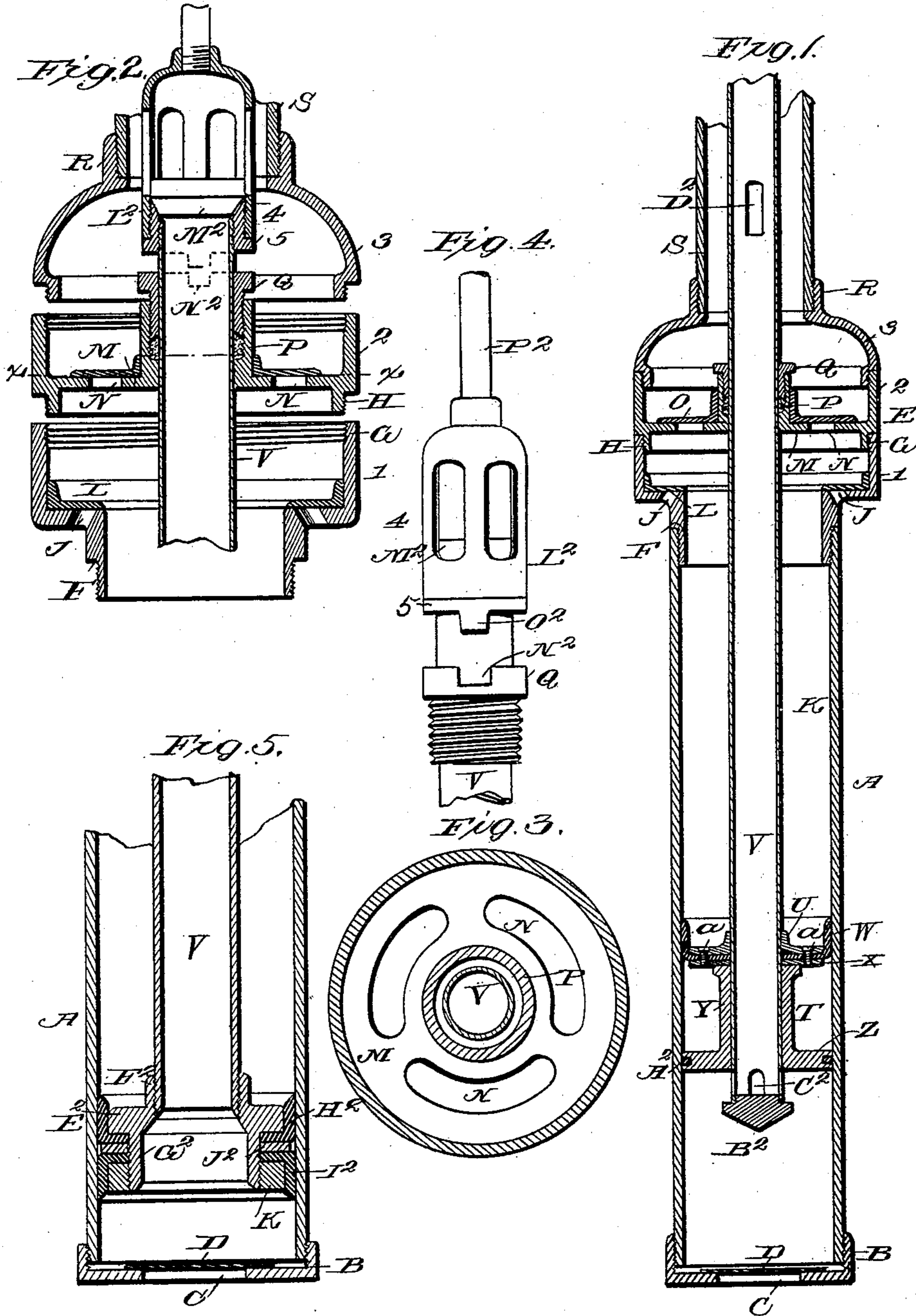
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Patented Feb. 7, 1899.

H. D. B. WILLIAMS & C. F. GRUENINGER.  
COMBINED SUBMERGED LIFTING AND FORCE PUMP.

(Application filed Oct. 27, 1897.)

(No Model.)



Witnesses

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# UNITED STATES PATENT OFFICE.

HUBBARD D. B. WILLIAMS AND CARL F. GRUENINGER, OF MANSFIELD, OHIO;  
SAID WILLIAMS ASSIGNOR OF HIS RIGHT TO ARNOLD KALLMERTEN, OF  
SAME PLACE.

## COMBINED SUBMERGED LIFTING AND FORCE PUMP.

SPECIFICATION forming part of Letters Patent No. 619,033, dated February 7, 1899.

Application filed October 27, 1897. Serial No. 656,527. (No model.)

*To all whom it may concern:*

Be it known that we, HUBBARD D. B. WILLIAMS and CARL GRUENINGER, citizens of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in a Combined Submerged Lifting and Force Pump; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in combined submerged lifting and force pumps; and the objects of our invention are, first, to provide a pump which will lift the water at the upward stroke of the piston into the discharge-pipe and at the downward stroke of the piston to force the water in the lower part of the pump-barrel upward through a tubular piston-rod and discharge the same into the discharge-pipe; second, to so construct and arrange the stuffing-box formed in the upper end of the pump that the packing surrounding the piston-rod can be adjusted without removing the pump from the well or detaching the discharge-pipe, and, third, to make a cheap, durable, and efficient means for the purpose stated. We accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of our improved combined submerged lifting and force pump, showing the construction and general arrangements of the parts. Fig. 2 is an enlarged view of the pump-cap in section, showing each part detached, also showing the tubular piston-rod cap for the same and check-valve and stuffing-box and mode of adjusting the same. Fig. 3 is a transverse sectional view of a portion of the cap, taken in line *x x*, Fig. 2, showing the discharge-ports. Fig. 4 is a view showing more fully the construction of the tubular piston-rod cap, also showing a portion of the tubular piston-rod secured in the lower end of the cap, also showing stuffing-box surrounding the piston-rod and general construction of the same. Fig.

5 is an enlarged view of piston, tubular piston-rod, a portion of pump-barrel, and lower inlet-valve, showing the full construction of all the parts.

Similar letters and numerals of reference indicate the parts throughout the several views.

In the accompanying drawings, A indicates the pump-barrel or cylinder.

B is a cap forming the bottom of the barrel. The said cap is screw-threaded upon the inside and is screwed upon the lower end of the pump-barrel. The said cap is provided with the inlet-port C and valve D. The upper end of the barrel is provided with the cap E. The said cap is made in three parts—1, 2, and 3. The part 1 is made larger in diameter than the pump-barrel and is provided with the downwardly-projecting sleeve F, threaded upon the outside and screwed within the upper end of the pump-barrel. The upper end is provided upon the inside with the threads G, which conform to the threads H formed upon the outside of the sleeve forming the center portion of the cap, (marked 2.) The bottom I of the part marked 1 is provided with a number of inlet-ports J on a line with the outer diameter of the pump-barrel. These ports form the passage for the water to supply the upper portion of the barrel K. A check-valve L is placed within the cap closing the ports J. The said valve has an opening through the center the full diameter of the sleeve F. The bottom M, forming the center part 2, is also provided with ports N, check-valve O, upwardly-projecting sleeve P, and stuffing-box Q. The upper portion (marked 3) screws within the center portion 2. The top may be flat or crowned, as shown, and provided upon the top with the sleeve R, threaded upon the inside and in which is secured the discharge-pipe S.

We have shown in Figs. 1 and 5 two differently-constructed pistons to operate in conjunction with a hollow or tubular piston-rod. The one shown in Fig. 1 we will first describe.

T indicates a piston, which is composed of the head U, secured rigidly upon the tubular piston-rod V. The said head is provided with a cup-shaped leather valve W. The said valve is secured to the head by the metal washer X and held by the screws *a a*. Y is a metal

sleeve provided with the flange Z in diameter the size of the inside of the pump-barrel. The said flange is provided with suitable packing A<sup>2</sup> to impinge the inner wall of the barrel. This portion of the piston is loose upon the tubular piston-rod. A cap B<sup>2</sup> is screwed within the lower end of the piston-rod, and ports C<sup>2</sup> are made through the piston-rod for the discharge of the water in the cylinder at the downward stroke of the piston.

In Fig. 1 we have shown the piston in position when in its downward movement, the water passing through the ports C<sup>2</sup> up through the tubular piston-rod through the ports D<sup>2</sup> into the discharge-pipe S. It will be readily seen by those skilled in the art that when the piston is moving downwardly the check-valve L rises, allowing the water to enter the ports J, supplying the upper portion of the cylinder. A reverse movement of the piston raises the valve D, the lower portion of the piston remaining stationary until the cap B<sup>2</sup> comes in contact with the flange Z, the valve L closes, and the pressure of the water opens the valve O, forcing the water through the ports N into the discharge-pipe S.

The piston, as shown in Fig. 5, is composed of the head E<sup>2</sup>, having an upwardly-projecting sleeve F<sup>2</sup>, in which is secured the tubular piston-rod V. A downwardly-projecting sleeve G<sup>2</sup> is formed upon the under side of the head and is threaded upon the outside. Two cup-shaped leather valves H<sup>2</sup> and I<sup>2</sup> are placed upon the sleeve, a metal washer J<sup>2</sup> placed between the two leather valves, and a nut K<sup>2</sup> clamps the valves and washer rigidly to the piston-head. The upper end of the tubular piston-rod is shown in Figs. 2 and 4. It is provided with a hollow slotted cap L<sup>2</sup>. The said cap is composed of two parts 4 and 5. The lower portion 5 is screwed upon the upper end of the tubular piston-rod. The part 4 is attached to the part 5 by threads—male and female. A check-valve M<sup>2</sup> is placed within the hollow cap L<sup>2</sup>, which closes the upper end of the tubular piston-rod when the piston is in its upward movement and opens when the piston is in its downward movement. The object of the said check-valve is to prevent the water in the discharge-pipe from filling the lower portion of the cylinder when the piston is discharging the water from the upper portion of the cylinder. The gland or stuffing-box Q is provided with a notch

N<sup>2</sup>, one upon each side. The lower end of the cap L<sup>2</sup> is also provided with downwardly-projecting lugs O<sup>2</sup>, which mesh into the notches N<sup>2</sup>. The object of the lugs and notches are for the purpose of compressing the packing at any time should it become worn from use without removing the pump from the well. It will be readily seen that when the connecting-rod P<sup>2</sup> is detached from the pump-handle it can be rotated, turning the cap L<sup>2</sup>, tubular piston-rod, and piston. The piston is forced downward in the barrel until the lugs O<sup>2</sup> pass into the notches N<sup>2</sup>. By turning the connecting-rod to the right turns also the gland Q, compressing the packing within the stuffing-box.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a double-acting submerged lifting and force pump, the combination with the barrel having its lower and upper ends screw-threaded and having valve-controlled caps secured thereon, of a hollow piston-rod having inlet and outlet openings therein and having a piston upon its lower end consisting of the rigid cup-shaped head, the movable sleeve having the flange with the packing-ring upon its outer edge adapted to contact the side of the pump-barrel, and a cap secured in the lower end of the piston-rod to limit the movement of the movable sleeve upon the piston-rod.

2. In a double-acting pump, the combination with the barrel having its upper and lower ends screw-threaded, a sectional cap secured upon the upper end and having valves within two of the sections, of a hollow piston-rod provided with the slotted cap, a valve in said cap to close the top of the piston-rod, and a piston-head at the bottom of the rod consisting of the rigid cup-shaped head, the movable sleeve having the flange with a groove in which fits a packing-ring, and a cap secured on the end of the rod to limit the movement of the flanged sleeve.

In testimony whereof we affix our signatures in presence of two witnesses.

HUBBARD D. B. WILLIAMS.  
CARL F. GRUENINGER.

Witnesses:

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