(No Model.)

B. F. KENDALL.

FORCE PUMP.

No. 430,251. Patented June 17, 1890

Fig. 1.

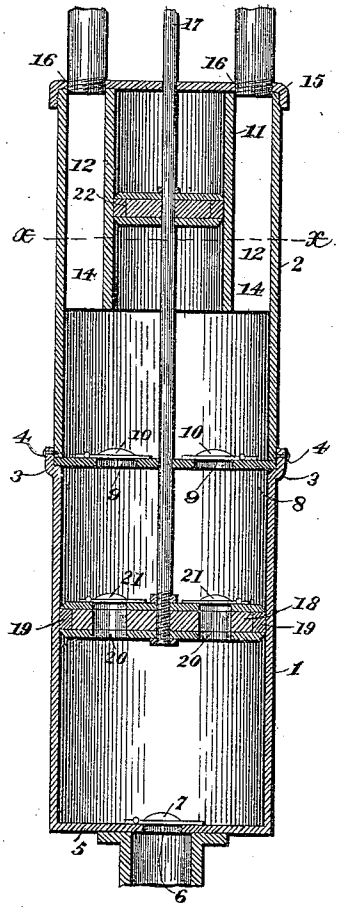


Fig. 3.

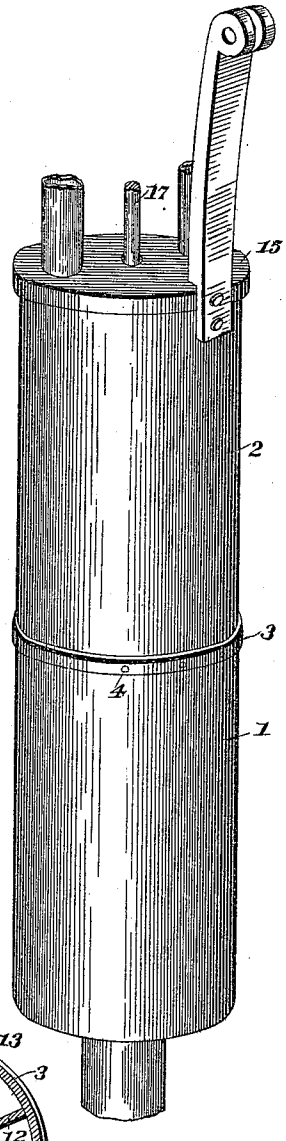
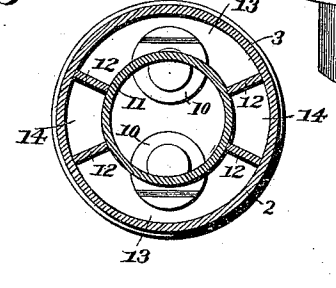


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN F. KENDALL, OF JEFFERSON, PENNSYLVANIA.

FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 430,251, dated June 17, 1890.

Application filed August 19, 1889. Serial No. 321,278. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. KENDALL, a citizen of the United States, residing at Jefferson, in the county of Greene and State of Pennsylvania, have invented a new and useful Force-Pump, of which the following is a specification.

This invention relates to force-pumps; and it has for its object to provide a device of this class which shall be simple, durable, and efficient, which may be readily used either as a stationary or as a portable force-pump, and which may be constructed at a moderate expense.

The invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claim.

In the drawings hereto annexed, Figure 1 is a vertical sectional view of a force-pump embodying my improvements. Fig. 2 is a horizontal sectional view taken on the line *x x* in Fig. 1. Fig. 3 is a perspective view.

Like numerals of reference indicate like parts in all the figures.

The outer or main cylinder of my improved force-pump is composed of a lower and an upper section. (Designated, respectively, by 1 and 2.) The lower section 1 is provided at its upper edge with a flange 3, forming a seat for the lower end of the upper section 2, which is secured to the said flange by means of stud-bolts 4. The bottom 5 of the lower cylinder-section has an inlet or opening 6, covered by an upwardly-opening valve 7. Interposed between the upper and lower cylinder-sections and seated upon the upper edge of the latter is a closely-fitting diaphragm 8, provided on diametrically-opposite sides with openings 9 9, covered by upwardly-opening valves 10. Located within the upper cylinder 2 is an auxiliary cylinder 11, of smaller diameter than the said cylinder 2, with which it is connected on diametrically-opposite sides by two pairs of radial wings or plates 12 12, whereby the spaces between the said cylinders 2 and 11 are divided into the air-chambers 13 and the exit-channels 14 14, which are located on diametrically-opposite sides. A cover 15 is provided, which tightly closes the upper ends of the air-chambers 13, and which is provided with exit-openings 16, registering with the exit-channels 14. The said cover may also completely cover the inner auxiliary cylinder 11; but this is not absolutely essential. The auxiliary cylinder 11 extends downwardly to within a short distance of the horizontal diaphragm 8.

17 designates the piston-rod, which extends through suitable openings or bearings in the cover 15 and in the diaphragm 8. The lower end of the piston-rod carries the piston 18, which is provided with suitable packing 19, whereby it is caused to fit snugly in the lower cylinder 1. The said piston 18 is provided on diametrically-opposite sides with openings 20, covered by upwardly-opening valves 21. The piston-rod 17 also carries a supplementary piston 22, working and fitting snugly in the auxiliary cylinder 11.

In operation, on the first upward stroke of the piston-rod water enters the lower cylinder through the valve 7 below the lower piston. On the downward stroke the water passes through the valve-openings in the lower piston into the upper end of the lower cylinder. By the next upstroke the lower piston forces the water through the valve-openings in the diaphragm 8 into the upper cylinder, and on the next downstroke the water is expelled from the said upper cylinder by the action of the piston 22. The water will, on the continued operation of the piston, rise in the air-chambers 13, which conduce to the maintenance of steady streams. At the same time by the conjoint action of the two pistons the water will be thrown with considerable degree of force and may be raised to a considerable height.

By supplying the upper cylinder of my improved force-pump with a bracket adapted to form a fulcrum, as shown in Fig. 3 of the drawings, which said bracket may be bolted detachably to the cylinder, an operating-lever may be pivoted directly to such bracket and connected with the piston-rod in any suitable manner, thus converting the device into a portable force-pump.

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

A double-acting force-pump consisting of an upper and a lower cylinder separated by

a valved diaphragm, an upwardly-opening valve in the lower cylinder, a supplemental cylinder secured in the upper end of the upper cylinder by radial plates or wings extending to the top of the cylinder and forming air-chambers and exit-channels, the latter having exit-pipes at their upper ends, and the vertically-movable piston-rod extending through the top of the upper cylinder and through the valved diaphragm and having a valved piston working in the lower cylinder and a solid piston working in the supplemental cylinder, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

BENJAMIN F. KENDALL.

Witnesses:
E. W. PARKINSON,
J. F. COTTERREL.