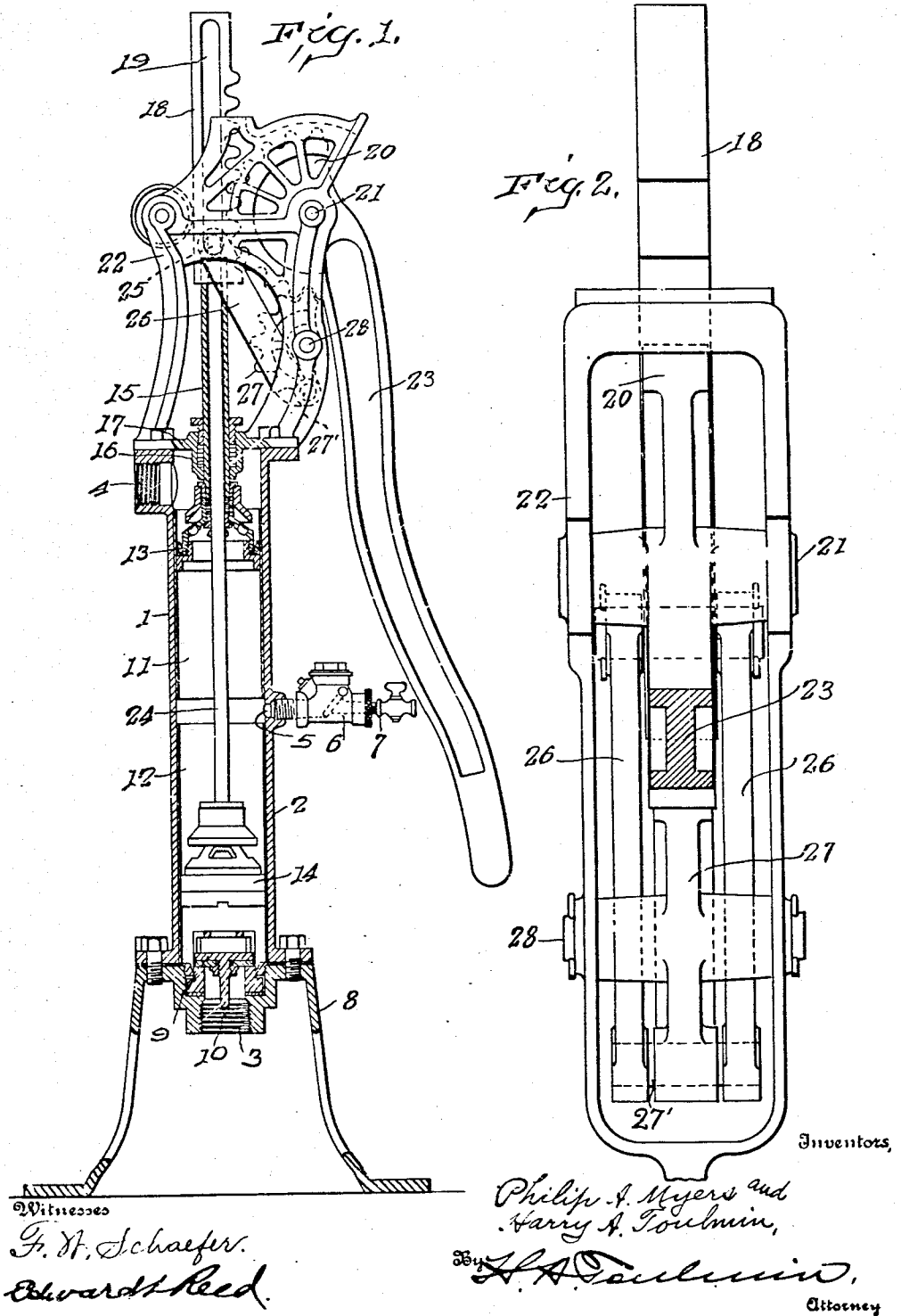


PUMP.

956,990.

Patented May 3, 1910.



UNITED STATES PATENT OFFICE.

PHILIP A. MYERS, OF ASHLAND, AND HARRY A. TOULMIN, OF SPRINGFIELD, OHIO,
ASSIGNORS TO F. E. MYERS AND BROTHER, OF ASHLAND, OHIO.

PUMP.

956,990.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed February 11, 1909. Serial No. 477,299.

To all whom it may concern:

Be it known that we, PHILIP A. MYERS, residing at Ashland, in the county of Ashland and State of Ohio, and HARRY A. TOULMIN, residing at Springfield, in the county of Clark and State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to pumps of the character adapted to pump water and air simultaneously into a storage tank and one object of the invention is to provide such a pump comprising two cylinders of substantially equal diameters, each of which has mounted therein a piston, the piston in one of said cylinders being adapted to move a greater distance than the piston in the other cylinder, thus giving the first-mentioned cylinder a greater capacity than the last-mentioned cylinder.

A second object of the invention is to provide means for actuating two pistons simultaneously to move the same unequal distances and for moving said pistons in opposite directions.

A further object is to so construct the pump embodying these features that it will be of a comparatively simple character, involving no parts or mechanism liable to be disarranged or easily broken.

With these objects in view our invention consists in certain novel features and in certain combinations and arrangements of parts hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a pump embodying our invention; and Fig. 2 is a rear elevation of the operating mechanism for the pistons with the pump handle broken away.

In these drawings we have illustrated one embodiment of our invention and have shown the same as comprising two cylinders, 1 and 2, which cylinders are of substantially equal diameters, are in communication one with the other and are preferably formed integral. The lowermost cylinder is provided with an inlet 3 and the upper cylinder with an outlet 4. An air inlet 5 is arranged to admit air to the cylinder 1 and is preferably controlled by a check valve 6 having a cut-

off, such as a pet cock 7, to regulate the admission of air thereto. The lower cylinder 2 is, in the present instance, mounted on a base 8 which forms the lower head of that cylinder and has formed therein the inlet 3. This inlet is controlled by a valve 9 and has surrounding the same a threaded boss 10 adapted to receive one end of the suction or water pipe.

Each of the cylinders 1 and 2 is provided with a separate lining or working cylinder 11 and 12, respectively, and mounted within each of these working cylinders are pistons 13 and 14, respectively. The piston 13 in the upper cylinder 1 is provided with a tubular piston rod 15 which extends upwardly through the stuffing box 16 in the head 17 of the cylinder and has at its upper end a rack bar 18 having a longitudinal slot 19. This rack bar meshes with a toothed segment 20 which is pivotally mounted at 21 between the two members of a supporting bracket 22 carried by the head 17 of the upper cylinder 1, and has connected thereto a pump handle 23, the operation of which actuates the piston rod 15 to reciprocate the piston 13 in the cylinder 1. The piston 14 has a piston rod 24 extending upwardly through the piston 13 and the tubular piston rod 15 and into the slot 19 of the rack bar 18. The upper end of the piston rod 24 is connected by means of a pin 25 to a link 26, preferably comprising two members, one arranged on each side of the rack bar. The opposite end of the link 26 is connected to a toothed segment 27 journaled at 28 in the frame 22 and adapted to mesh with the toothed segment 20. The arrangement of the segment 27 relatively to the piston rod 24 is such that the oscillation of the segment 27 will reciprocate the piston rod 24 and its piston 14. The link 26 is connected to the lower portion of the segment 27 and this segment is arranged beneath the segment 20. Consequently, the actuation of the segment 20 to move the tubular piston rod 15 and its piston 13 downward will cause the segment 27 to move in a direction opposite that in which the segment 20 is moving. Thus, the piston rod 24 and its piston 14 will be moved upward or in a direction opposite to that of the piston 13. The diameters of the segments 20 and 27 are unequal, and, therefore, the travel of the pistons 13 and 14 is unequal in distance. The radius, from center

to pitch line, of the segment 20 is greater than the radius from the center of the segment 27 to the wrist pin 27' which connects the link 26 with the segment 27. Consequently, the piston 13 will have a stroke of greater length than the stroke of the piston 14 and the capacity of the cylinder 1 will be correspondingly greater than the capacity of the cylinder 2. It will be apparent, therefore, that when the pump handle 22 is actuated the pistons 13 and 14 will be simultaneously moved unequal distances and in opposite directions, thereby causing the piston 13 in the cylinder 1 not only to lift and discharge the water delivered to that cylinder by the piston 14 of the cylinder 2, but also causing the piston 13 to draw in, through the air inlet 5, an amount of air substantially equal to the difference in capacity between the cylinders 1 and 2, which air is discharged through the outlet 4 upon the next upward stroke of the piston 13.

We regard ourselves as the first to produce a combined water and air pump wherein pistons are employed having unequal strokes and cylinders of unequal length in the working portion, so that the capacity of one of the pistons and its cylinder will be greater than that of the other, combined with an air inlet leading into the cylinder having the greater capacity, so that the excess of capacity of that cylinder over the other will cause it to be supplied with air in addition to the water it takes up. We further regard ourselves as the first to produce such a structure when the cylinders and pistons are of substantially the same diameter. And we likewise consider ourselves the first to produce such a structure when, in addition to the cylinders and pistons being of the same diameter, and the pistons having the differential lengths of stroke, they also move in opposite directions at the same time.

We wish it to be understood that we do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. In a pump of the character described, intercommunicating cylinders, one having a water inlet, the other a water discharge, and the latter an air inlet, a piston and its rod for each cylinder operating in opposite directions, the piston in the cylinder having the air supply and water discharge having a greater stroke than the other piston, and means to so actuate said pistons.

2. A pump of the character described comprising two cylinders of substantially equal diameters and in communication one with

the other, one of said cylinders having an inlet and the other having an outlet, an air inlet valve arranged to admit air to the last-mentioned cylinder, a piston in each of said cylinders having unequal strokes, and means for so actuating said pistons.

3. A pump of the character described comprising two cylinders of substantially equal diameters and in communication one with the other, one of said cylinders having an inlet and the other having an outlet, an air inlet valve arranged to admit air to the last-mentioned cylinder, a piston in each of said cylinders, and means for simultaneously actuating said pistons to move the same in opposite directions and unequal distances.

4. A pump of the character described comprising two cylinders of equal diameters arranged one above the other and in communication one with the other, one of said cylinders having a water inlet, the other of said cylinders having an air inlet and an outlet, a piston in each of said cylinders, and means for moving the piston in the upper cylinder a greater distance than the piston in the lower cylinder is moved.

5. A pump of the character described comprising two cylinders of substantially equal diameters arranged one above the other and in communication one with the other, one of said cylinders having a water inlet, the other of said cylinders having an air inlet and an outlet, a piston in each of said cylinders, and means for simultaneously actuating said pistons in opposite directions, said actuating means being arranged to move the piston in the upper cylinder a greater distance than the piston in the lower cylinder is moved.

6. A pump of the character described comprising two cylinders of equal diameters arranged one above the other and in communication one with the other, a piston in each of said cylinders, an inlet in the lower cylinder, an outlet in the upper cylinder, an air inlet arranged beneath the lower limit of movement of the piston in the upper cylinder, and means for actuating said pistons, said actuating means being arranged to move the piston in the upper cylinder a greater distance than the piston in the lower cylinder is moved.

7. A pump of the character described comprising two cylinders, a piston in each of said cylinders, and means for simultaneously actuating said pistons in opposite directions, said actuating means being arranged to move one of said pistons a greater distance than the other piston is moved.

8. A pump of the character described comprising two cylinders arranged one above the other and having an air inlet for the upper cylinder, a piston in each of said cylinders, a hollow piston rod for the piston in the upper cylinder, means for actuating said

piston rod, a piston rod for the piston in the lower cylinder extending through said hollow piston rod, and means for actuating said last-mentioned piston rod.

- 5 9. A pump of the character described comprising two cylinders arranged one above the other, a piston in each of said cylinders, a hollow piston rod for the upper cylinder, and a rack secured to the upper end of said
10 hollow piston rod, a toothed segment pivotally mounted and meshing with said rack, means for actuating said segment, a piston rod for the lower piston extending through the upper piston and the hollow piston rod,
15 a second toothed segment of less diameter than the first-mentioned segment pivotally

mounted on the pump and operated by said first-mentioned segment, and means for connecting the smaller segment with the last-mentioned piston rod.

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

PHILIP A. MYERS.

HARRY A. TOULMIN.

Witnesses to the signature of Philip A. Myers:

F. B. KELLOGG,

R. McD. TUBBS.

Witnesses to the signature of Harry A. Toulmin:

HARRIET L. HAMMAKER,

F. W. SCHAEFER.

20