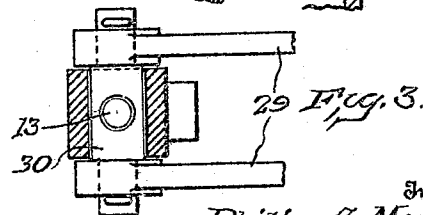
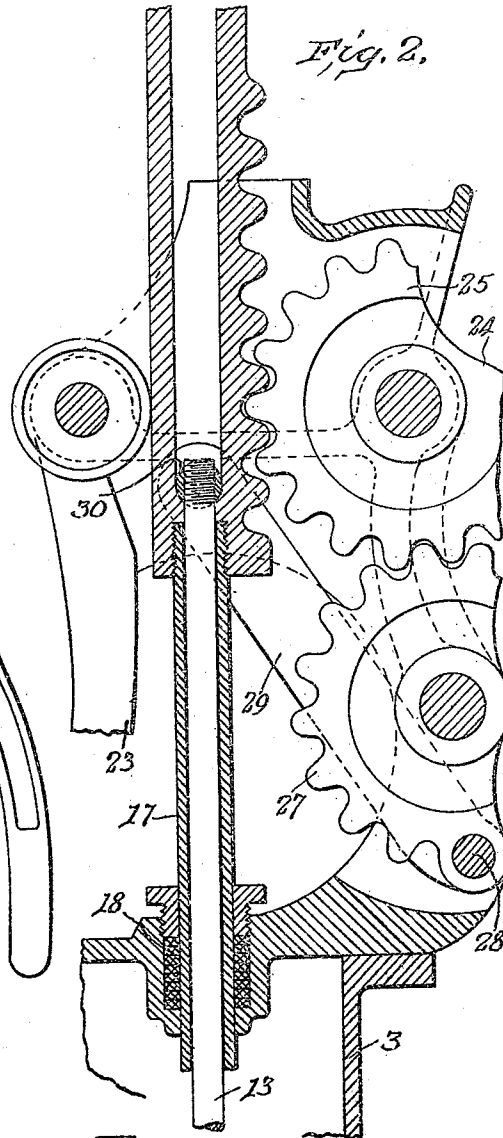
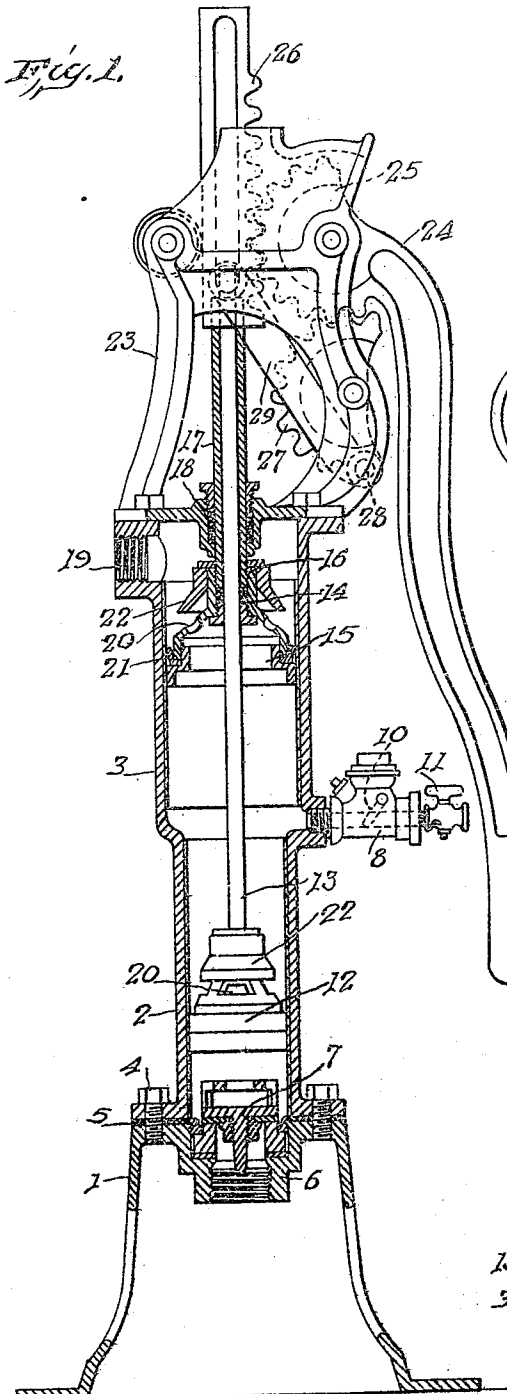


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PUMP.

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949,940.

Patented Feb. 22, 1910.



Witnesses

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PUMP.

949,940.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PHILIP A. MYERS, a citizen of the United States, residing at Ashland, in the county of Ashland and State of Ohio, 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 improvements in pumps, of that character wherein water is pumped by a pair of cylinders, one cylinder receiving its water supply from the other, and one cylinder also drawing in air in addition to the water, so that the pump will discharge both water and air.

In an application filed by me and my joint inventor, on February 11th, 1909, Ser. No. 477,299, we disclose and claim such a pump whose chief characteristic consists in different lengths of strokes of the pistons, with a sameness of diameter in the two cylinders, the longer stroke of one piston, and, therefore, the greater length of its cylinder, giving such cylinder a greater capacity than the other, and this excess of capacity being filled with air.

In the present invention the chief characteristic is in utilizing the same length of stroke of the two pistons, but using cylinders of different diameters, so that the excess of capacity of the one cylinder over the other is obtained not by a greater length, but by a greater diameter over the other. In both the pump of said joint application and in the pump of this present application, the two pistons employed are moved simultaneously in opposite directions for the purpose of producing a pump which, with one cylinder of greater capacity than the other, the excess being for pumping air, will discharge a continuous stream of water and air, the discharge being maintained on both strokes of the handle.

The present invention, therefore, has for its chief feature the two cylinders of different diameters, the larger one being supplied with an air inlet, and the two pistons of equal stroke and traveling in opposite directions.

In the accompanying drawings Figure 1 is a vertical sectional view of a pump embodying these improvements, with one form of operating means shown essentially in side elevation; Fig. 2, an enlarged detail view in vertical partial section and side elevation of

this operating mechanism; and Fig. 3, a detail plan view of one of the piston rods, its cross-head and operating links.

Upon a special or conventional base 1, adapted to be secured upon a well platform, I place and attach the pump proper, comprising a cylinder 2 and a larger cylinder 3, which intercommunicate, and may be, as shown in the present instance, of one continuous piece or casting, though this is not material. Bolts and nuts 4 secure the cylinder 2 to this base, with an intervening packing 5 to prevent leakage. The base has a cup 6 within it, which, in effect, forms a cap for the lower end of the cylinder 2. In this cup or cap is secured the water pipe, which extends down into the well or other source of supply. In this cup or cap is also mounted a check-valve 7, of any approved or selected type, adapted to lift from its seat when the piston above it moves upward and to reseal and check the water in the cylinder when the piston moves downward.

At a suitable point the cylinder 3, preferably at its lower extremity, is provided with an air inlet valve 8, screwed into an orifice in the side of the cylinder and carrying, in the type shown, a butterfly valve proper 10, with a cock 11 screwed into the end of the valve casing 8. By these means air is admitted into or, if desired, cut off from the larger cylinder 3, or the quantity admitted controlled by the cock 11. It will be observed that the cylinder 3 is of greater capacity than the cylinder 2, say one-third or one-fourth more. This excess of capacity in one cylinder over the other is for the purpose of giving space for the indrawn air to enter and occupy, at the same time the larger cylinder is charged with water, delivered to it from the smaller cylinder. The contents of the smaller cylinder will not fill the larger, and the surplus capacity of the larger is utilized to accommodate the indrawn air. In this way the larger cylinder becomes charged with both water and air and discharges both of them. From this it will be understood that this pump is specially adapted for use with water and air storage tanks into which water and air are pumped under pressure, that is, in which pressure is created by the charging of the tank with air as well as water, the air being compressed to form the pressure. This pressure is utilized to force the water from the

tank into elevated or remote places for use in a water distribution plant, say in a residence or factory. Referring to the pistons for these cylinders, it will be seen that the smaller piston 12 occupies the smaller cylinder and is connected to a piston-rod 13, which extends thence through both cylinders, and through a stuffing-box 14; then the larger piston 15 occupies the larger cylinder and is connected at 16 with a hollow piston-rod 17, which itself extends through a stuffing-box 18, carried by the cap of this cylinder, and also to the operating means. The stuffing-box 14 is conveniently formed between the piston 15 and the lower end of the tubular piston-rod 17, as shown, and its function is to prevent a leakage of air or water about the inner piston-rod 13, it being noted that this rod is within the tubular rod 17. At 19 is shown the discharge orifice from the larger cylinder, out of which pass the water and the air to any suitable point of delivery, by means of any desired connection.

The pistons 12 and 15 are of any suitable type, being composed, in the present case, each of a shell having water passages 20 and carrying packings 21, with a slidable cup 22, which, when the pistons are descending, remains up and, when the pistons are ascending, remains down and covers the water orifices 20, to prevent the water, which is being lifted by the pistons, from escaping.

I will now refer to one arrangement or construction of operating means for the piston-rods. In an open-work standard 23, secured to the cap of the upper cylinder, I mount an operating handle 24 having a toothed segment 25, which meshes with a rack 26 secured to the upper end of the tubular piston-rod 17. Hence, on working the handle 24 up and down, reciprocating motion is imparted to the piston 15 in the larger cylinder. Also mounted in the standard 23 is a mutilated gear, in the nature of a toothed segment 27, which meshes with the segment 25, is of the same diameter and receives motion therefrom. A wrist-pin 28 on the mutilated gear 27, at a radius from the center of said gear equal to the radius of the segment 25, actuates a link 29 whose upper end connects with a cross-head 30 on the piston-rod 13. There are two of these wrist-pins and links, one at either side of the mutilated gear and at either end of the cross-head. Now it will be observed that when the handle is swung downward to lift the piston 15, the same stroke will lower the piston 12, and when the handle is lifted, the piston 15 will descend and the piston 12 will ascend. Thus the two pistons move at the same time, but in opposite directions. Hence these operations take place:—The lower piston makes an upstroke and draws into its cylinder a quantity of water; it then

descends, its valve opening, and on the next or upward stroke, its valve closing, lifts the first quantity of water into the larger cylinder and draws in another supply into its own cylinder; the upper piston is then at its lower limit, but starts upward as the lower piston again starts downward; the upper piston lifting and forcing out this first charge of water, into which air was drawn, if the cock 11 was open during the initial strokes of the piston 15, while the piston 12 was pumping in the first charge of water. Or the few initial strokes may be made with the cock 11 closed and when the pump has once started, then the cock may be opened and the air be drawn in. In either case, after the first few initial strokes, the stream becomes continuous and, when the cock 11 is opened, is charged with air, to an extent substantially equal to the difference in the cubic capacity of the two cylinders.

While I have used the terms upward and downward strokes of the pistons and lifting water from one cylinder into another, it will be understood that these are only relative terms, dependent upon the position of the pump, and that if the pump were inclined or in a horizontal position, the same actions would take place and the same terms would apply, except as modified by such position of the pump. It is obvious too that in this structure the two cylinders may not be immediately adjacent and that the two pistons need not necessarily be connected with the same operating means, so long as their strokes are in opposite directions at the same time, so as to effect the continuous water and air discharge.

I regard myself as the first to produce a combined water and air pump wherein are employed pistons having substantially equal strokes with cylinders of unequal capacity, the pistons moving in opposite directions at the same time, so that the capacity of one of the cylinders and its piston will be greater than that of the other, and the stream continuous, 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, resulting in a continuous stream of air as well as water.

It will be understood, of course, that the upper piston on its up-stroke acts also to "suck" or lift the water from the lower cylinder.

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

1. In a pump of the character described, the combination, of two cylinders of unequal diameters, the smaller having a water inlet and the larger having a water outlet and an air inlet, and a piston and its rod

for each cylinder, and means for imparting substantially equal strokes to the pistons and in opposite directions.

2. In a pump of the character described, the combination, of two cylinders of unequal diameters, the smaller having a water inlet and communicating with the larger, and the larger having both a water outlet and an air inlet, and a piston and its rod for each cylinder, and means for imparting simultaneously substantially equal strokes to the pistons and in opposite directions.

3. In a pump of the character described, the combination, of two cylinders of unequal diameters, placed end to end and intercommunicating, the smaller cylinder having a valved water inlet and the larger having a valved air inlet and a water outlet, and a piston and its rod for each cylinder, and a common primary actuating means operating through adjuncts to impart simultaneously substantially equal strokes to the pistons and in opposite directions.

4. In a pump of the character described, the combination, of two cylinders of unequal diameters, the smaller having a water inlet and the larger both an air inlet and a water outlet, and a piston and its rod for each cylinder, one piston-rod working through the other piston-rod, and means for imparting substantially equal strokes to the pistons and in opposite directions.

5. In a pump of the character described, the combination, of two cylinders of unequal diameters, the smaller having a water inlet and the larger having both an air inlet and a water outlet and arranged to receive water from the smaller cylinder, and a piston and its rod for each cylinder, the rod of the smaller piston passing through that of the larger piston, and a primary actuating

means operating through adjuncts to impart simultaneous equal strokes in opposite directions to the rods.

6. In a pump of the character described, a base, a cylinder mounted thereon with a valved water inlet, a larger cylinder opening into and mounted upon the first named cylinder, a valved air inlet for the larger cylinder and a water outlet, a piston and a hollow rod for the larger cylinder, a piston for the smaller cylinder and its rod passing through the other piston, a lever or handle connected with both rods by means which impart substantially equal strokes in opposite directions simultaneously to the rods.

7. In a pump of the character described, a lever or handle, a piston and its rod connected with the handle or lever to receive motion therefrom, a smaller piston and its rod, and means connecting it with the handle or lever and adapted to operate it simultaneously with the actuation of the first named rod, but in the opposite direction, in strokes of substantially equal length with the strokes of the first named rod.

8. In a pump of the character described, a standard, a handle with a toothed segment fulcrumed thereon, a mutilated gear meshing with the segment and journaled in the standard, and having wrist-pins, whose radius is substantially equal to the radius of the segment, a piston and its rod meshing with the segment and another piston having a cross-head and links connecting the cross-head to the wrist-pins.

In testimony whereof, I affix my signature in presence of two witnesses.

PHILIP A. MYERS.

Witnesses:

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R. M. TUBBS.