

P. A. MYERS.

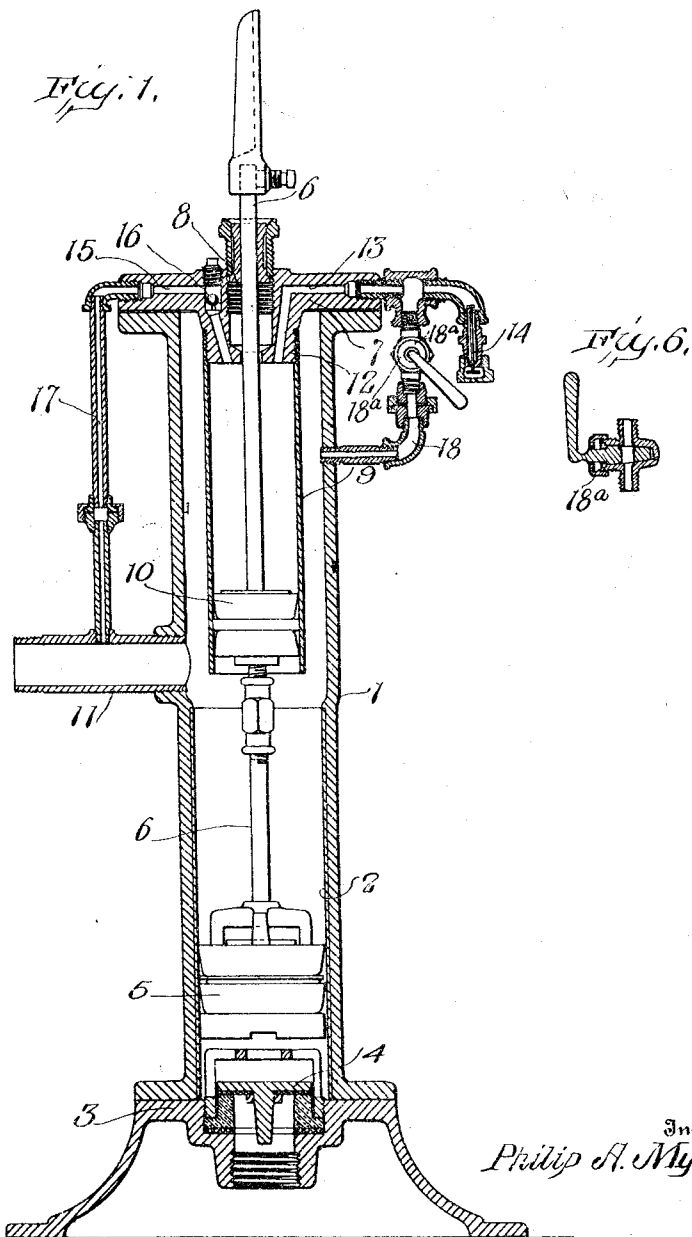
PUMP.

APPLICATION FILED JUNE 21, 1911.

1,065,709.

Patented June 24, 1913.

4 SHEETS-SHEET 1.



Witnesses

G. Howard Walmsley.
Harriet L. Hamaker.

By

Philip A. Myers,
Attorney.

P. A. MYERS.

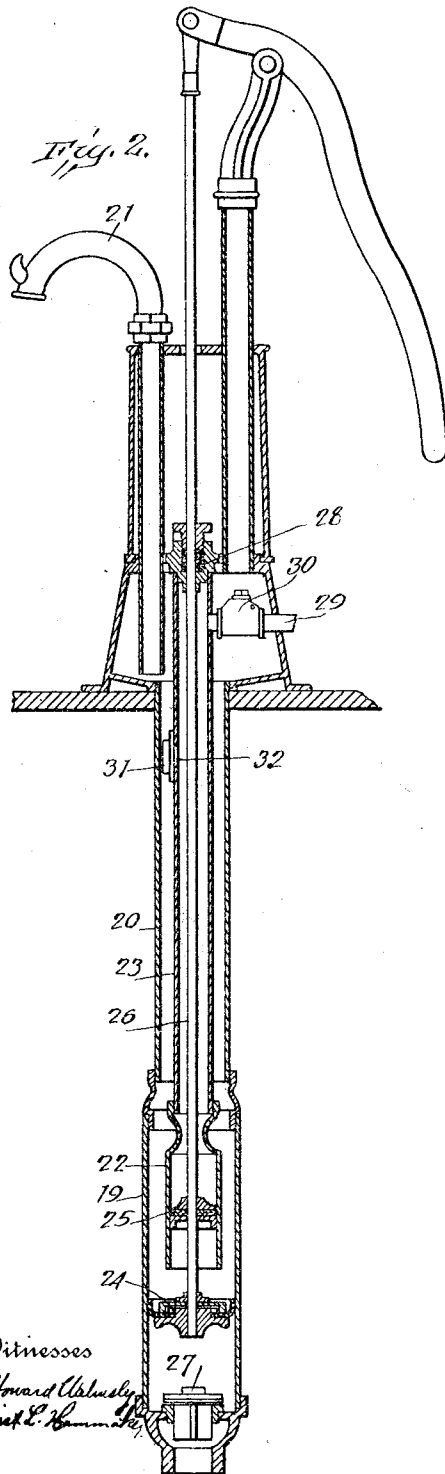
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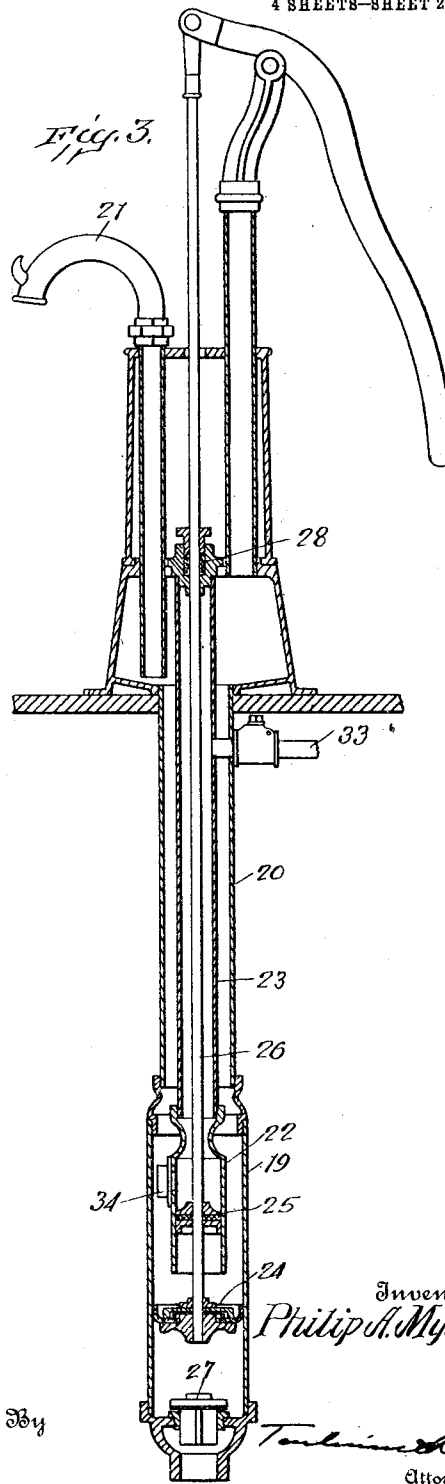
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4 SHEETS—SHEET 2.



Witnesses
G. Howard Chalmers
Harriet L. Hammon



By

Inventor
Philip A. Myers,

Toulmin & Reed
Attorneys

P. A. MYERS.
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4 SHEETS—SHEET 3.

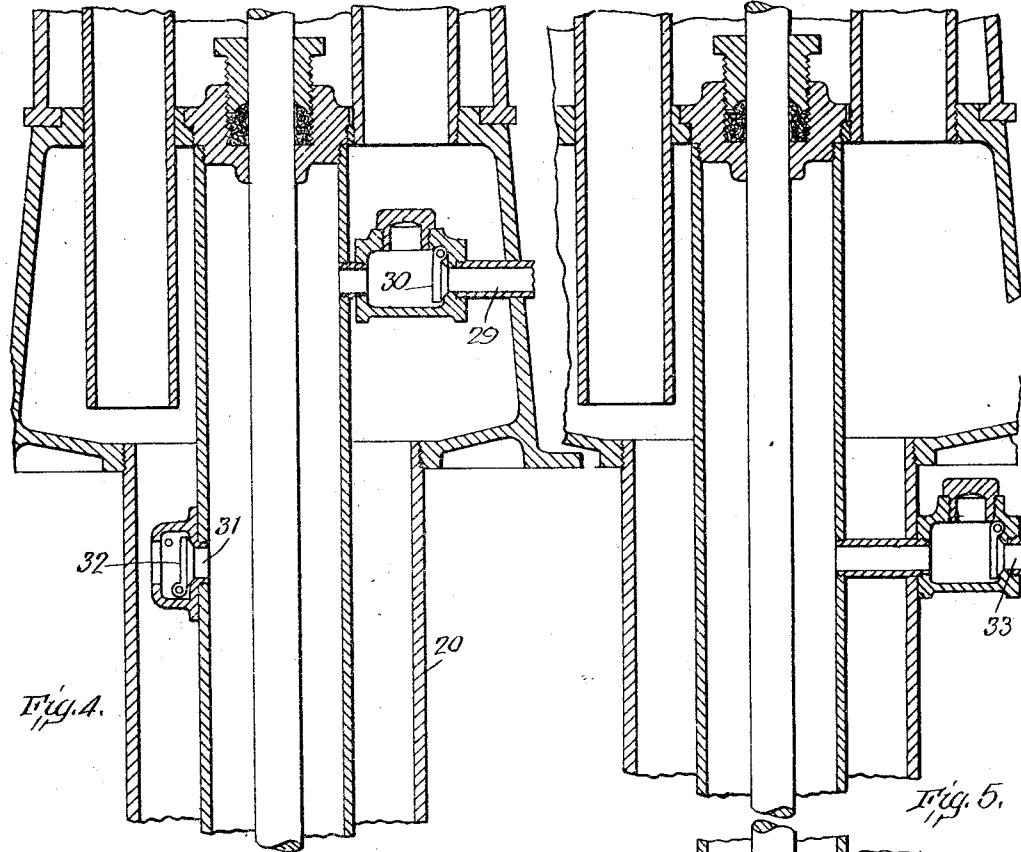
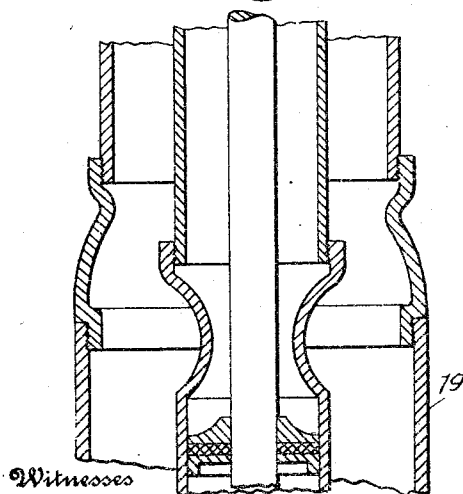


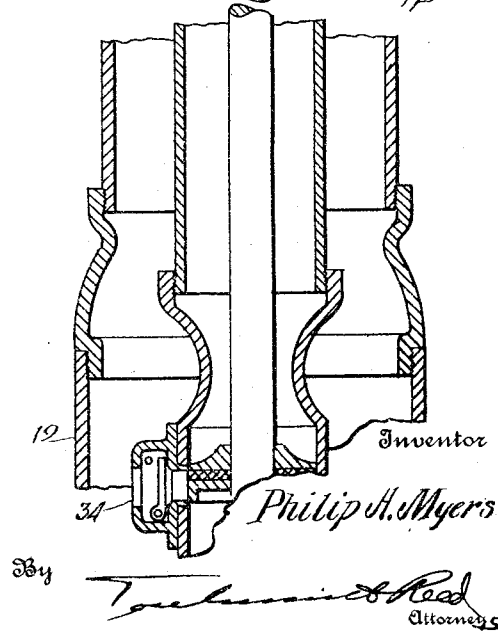
Fig. 4.

Fig. 5.



Witnesses

A. Howard Walmsley.
Harriet L. Hammett.



Inventor

Philip H. Myers

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Toussaint & Reed
Attorneys

P. A. MYERS.
PUMP.

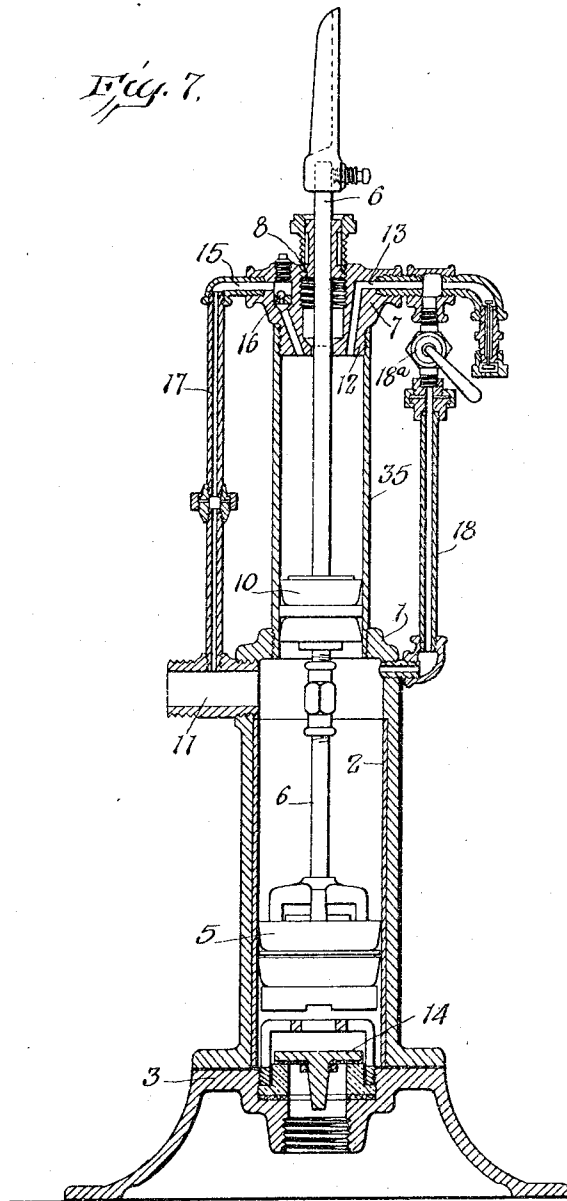
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4 SHEETS—SHEET 4.

Fig. 7.



Inventor

Philip A. Myers,

Witnesses

*G. Edward Wellesley,
Harriet L. Hammett.*

By *Touche & Reed*

Attorneys

UNITED STATES PATENT OFFICE.

PHILIP A. MYERS, OF ASHLAND, OHIO, ASSIGNOR TO F. E. MYERS AND BROTHER, OF ASHLAND, OHIO, A COPARTNERSHIP.

PUMP.

1,065,709.

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 drawing.

This invention relates to pumps and the object of the same is to provide a pump which, at the will of the operator, may be caused to pump both air and water or to pump water alone, and, to this end, it is a further object of the invention to provide a pumping cylinder having a reciprocating piston and having a water inlet and water outlet on one side of the piston and having an air inlet and air outlet on the other side of the piston.

It is also an object of the invention to provide a double acting pump in which the auxiliary water pumping cylinder will act also as an air pumping cylinder, thereby avoiding the necessity of providing an extra pumping cylinder and simplifying the construction of the pump; further, to provide a water jacket for the air pumping cylinder which will be in communication with the water pumping cylinder and thus provide a continuous water circulation about the air pumping cylinder and prevent the same from heating, thereby obviating what has heretofore constituted a very serious objection to the air pumping cylinder in water pumps; and further, to so construct and arrange the several parts of the pump as to produce a very simple and very easily operated pump which will have a high degree of efficiency.

In the accompanying drawings, Figure 1 is a sectional view, taken vertically through a pump embodying my invention; Fig. 2 is a similar view taken centrally through a different type of pump and showing a different manner of applying the invention thereto; Fig. 3 is a view similar to Fig. 2 showing a different arrangement of the air inlet and the air outlet; Fig. 4 is a sectional view, on a larger scale, of a portion of the pump shown in Fig. 2; Fig. 5 is a similar view of a portion of the pump shown in Fig. 3; Fig. 6 is a detail view of the valve in the by-pass; and Fig. 7 is a vertical, sectional view of a slightly modified form of pump embodying the invention.

In Fig. 1 of the accompanying drawing I have illustrated one embodiment of the invention and have shown the same as comprising a hollow body portion 1, preferably cylindrical and having formed in the lower part thereof a main or water pumping cylinder 2. The body portion 1 is supported upon a suitable base 3 which forms the bottom wall of the water pumping cylinder 2 and has the usual check valve 4. A valved piston 5, of ordinary construction, works within the cylinder 2 and is operated by a pump rod 6. That part of the body portion 1 which extends above the water pumping cylinder 2 is preferably of a diameter slightly larger than the water pumping cylinder and has its upper end closed by a cap 7 having therein a packing gland 8 through which said pump rod extends. Mounted within the upper part of the body portion 1 of the pump is an auxiliary cylinder 9 of a capacity somewhat less than the capacity of the main or water pumping cylinder 2. In the present instance the auxiliary cylinder is of a diameter somewhat less than the diameter of the upper part of the body portion and has a capacity equal approximately to half the capacity of the water pumping cylinder. Mounted within the auxiliary cylinder and rigidly connected to the pump rod 6, which extends through the same, is a piston 10 of ordinary construction. The body portion 1 is provided with a suitable outlet which communicates with both the main or water pumping cylinder 2 and the auxiliary cylinder 9, and, in the present instance, comprises a discharge spout 11 adapted to be connected with a pipe leading to a storage tank or other suitable receptacle in which the water and air are to be stored.

The operation of the pump so far described is that of the ordinary double acting pump. Upon the upward stroke of the pump rod and the pistons carried thereby a portion of the water lifted by the piston 5 of the water pumping cylinder will be discharged through the outlet 11 and a portion thereof will be drawn into the auxiliary cylinder 9. Upon the downward stroke of the pump rod and pistons the water which has been drawn into the auxiliary cylinder will be discharged through the outlet 11. In order that this auxiliary cylinder may be utilized as an air pumping cylinder it is

provided with valve controlled air inlets and outlets. In the present instance the auxiliary cylinder is supported from the cap 7 and has its upper end screw-threaded onto a depending portion of that cap, as shown at 12. Formed in the cap 7 is a conduit 13, provided with a check valve 14 and constituting an inlet passage, and a second conduit 15 having a check valve 16 and constituting an outlet passage. The conduit 15 communicates with the outlet for the body portion 1 of the pump. As here shown this communication is accomplished by means of a pipe 17 connected at one end with the conduit 15 and at the other end with the discharge pipe 11, but it will be obvious that this communication may be accomplished in various ways. The inlet conduit 13 is connected with the main cylinder 2 by means of a by-pass 18 having a cut-off valve 18^a. The by-pass may be connected to the cylinder at any suitable point and, in Fig. 1, I have shown the same as connected with the cylinder through the medium of the enlarged upper part of the body portion 1. When the valve 18^a is closed and the pump rod is operated in the usual manner the downward or discharge stroke of the piston 10 in the auxiliary cylinder will cause that cylinder to fill with air through the inlet passage 13 and upon the upward stroke of the piston this air will be discharged through the outlet passage 15, and, through the communication afforded by the pipe 17, will enter the discharge pipe for the pump and together with the water will pass to the storage tank. This operation takes place simultaneously with and without in any way interfering with the operation of the pump as a double acting water pump. By opening the valve the air pumping operation is interrupted and the pump operates in the manner of an ordinary double acting pump.

As stated above the diameter of the auxiliary cylinder 9 is somewhat less than the diameter of the upper part of the body portion of the pump, thus providing a space between the auxiliary cylinder and the inner wall of the body portion. This space being in open communication with the water pumping cylinder it is obvious that during the operation of the pump there will be a continuous circulation of water in the space between the cylinder and the walls of the body portion and that the inner cylinder is thus provided with a water jacket which prevents the overheating of that cylinder.

It will be obvious that the invention can be applied to pumps of various constructions, and, in Figs. 2 to 5, I have illustrated two methods of applying the same to a pump of a well known construction. This pump comprises a water pumping cylinder 19 supported at the lower end of a suction pipe 20 and communicating at its upper end with

a discharge spout 21. An auxiliary cylinder 22 is supported within the water pumping cylinder 19 by means of a tube 23 depending from the pump stand. The water pumping cylinder is provided with the usual piston 24 and the auxiliary cylinder with the piston 25, both of which are mounted on the same pump rod, shown at 26 and extending upward through the tube 23. The water pumping cylinder is provided at its lower end with an inlet valve 27.

The pump so far described is of a well known construction, and, to embody applicant's invention therein, the auxiliary pumping cylinder 22 is provided above the piston with an air inlet and an air outlet. To accomplish this the upper end of the tube 23 is closed by a stuffing box 28 through which the pump rod passes, and this tube is provided with an air inlet communicating with the atmosphere and controlled by a check valve and with an air outlet communicating with the interior of the suction pipe so that the air, when forced out of the tube 23, will mingle with the water in the suction pipe and be discharged therewith.

In that form of the device shown in Figs. 2 and 4 an inlet pipe 29 extends through the wall of the pump stand and is connected with the tube 23. A check valve 30 controls the flow of air through this pipe. The tube 23 is further provided with an outlet port 31 which, in the present instance, is arranged a short distance below the top of the suction pipe and is controlled by a valve 32. In the arrangement shown in Figs. 3 and 5 the inlet pipe 33 is connected with the tube 23 at a point below the platform and the outlet port 34 is formed in the upper part of the auxiliary cylinder 25 instead of being formed in the tube. The operation of the two devices is similar to that described in connection with Fig. 1.

It will be obvious that the pump can be used either with or without the water jacket, and, in Fig. 7, I have illustrated a pump similar to that shown in Fig. 1 with the exception that the inner cylinder, that is, the combined air and water pumping cylinder 35, constitutes the outer cylinder and is not surrounded by a water jacket, as is the corresponding cylinder 9 in Fig. 1. The lower end of the cylinder 35 is screwed into the upper part of the body portion 1 above the main cylinder 2. The operation of the pump is the same as that of the pump in Fig. 1 with the exception that the cooling action of the water about the exterior of the cylinder is lacking.

While I have here illustrated several embodiments of the invention it will be understood that these are chosen for the purpose of illustration only and that the essential features of the invention can be readily embodied in pumps of other types and I, there-

fore, wish it to be understood that I 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 my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A pump comprising two cylinders of different diameters arranged longitudinally one within the other, the larger cylinder being formed with a water inlet and a water outlet, the inner cylinder having one end in open communication with the larger cylinder and having its other end closed and formed with air inlet and outlet passages, a single piston-rod operating in said cylinders, and pistons carried by said rod and operating in the respective cylinders whereby the piston in the larger cylinder will pump water, and the piston in the smaller cylinder will pump air on one side and water on the other side thereof.

2. A pump comprising two cylinders of

different diameters arranged longitudinally one within the other, the larger cylinder being formed with a water inlet and a water outlet, the inner cylinder having one end in open communication with the larger cylinder and having its other end closed and formed with air inlet and outlet passages, a single piston-rod operating in said cylinders, pistons carried by said rod and operating in the respective cylinders whereby the piston in the larger cylinder will pump water, and the piston in the smaller cylinder will pump air on one side and water on the other side thereof, a by-pass connecting the air inlet and the larger cylinder, and a valve in said by-pass adapted when open to prevent the piston of the small cylinder from pumping air.

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

PHILIP A. MYERS.

Witnesses:

F. B. KELLOGG,
R. M. TUBBS.