(No Model.)

P. A. MYERS.

PUMP.

No. 263,944. Patented Sept. 5, 1882.

Fig. 1.

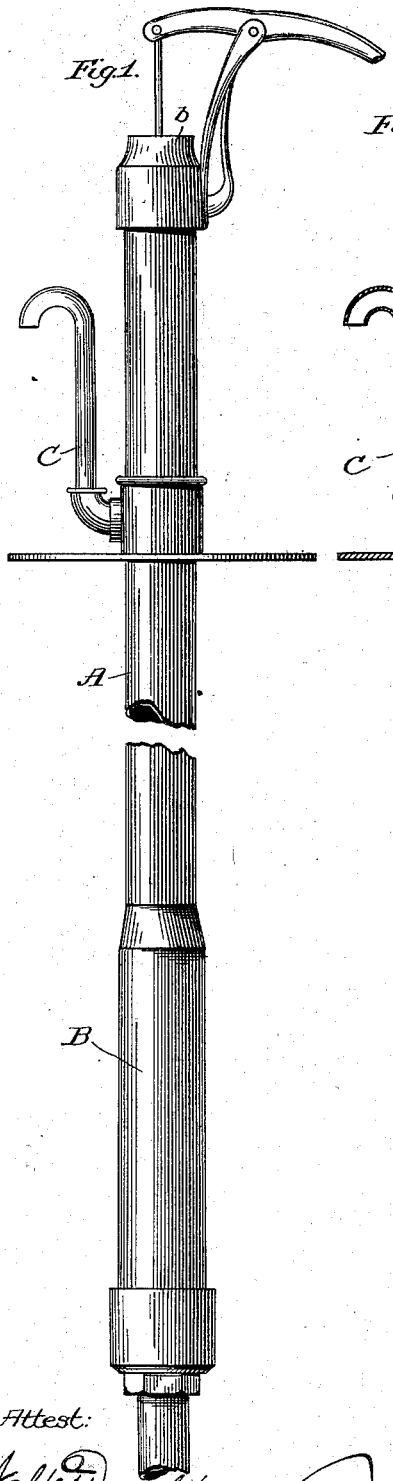

Fig. 2.

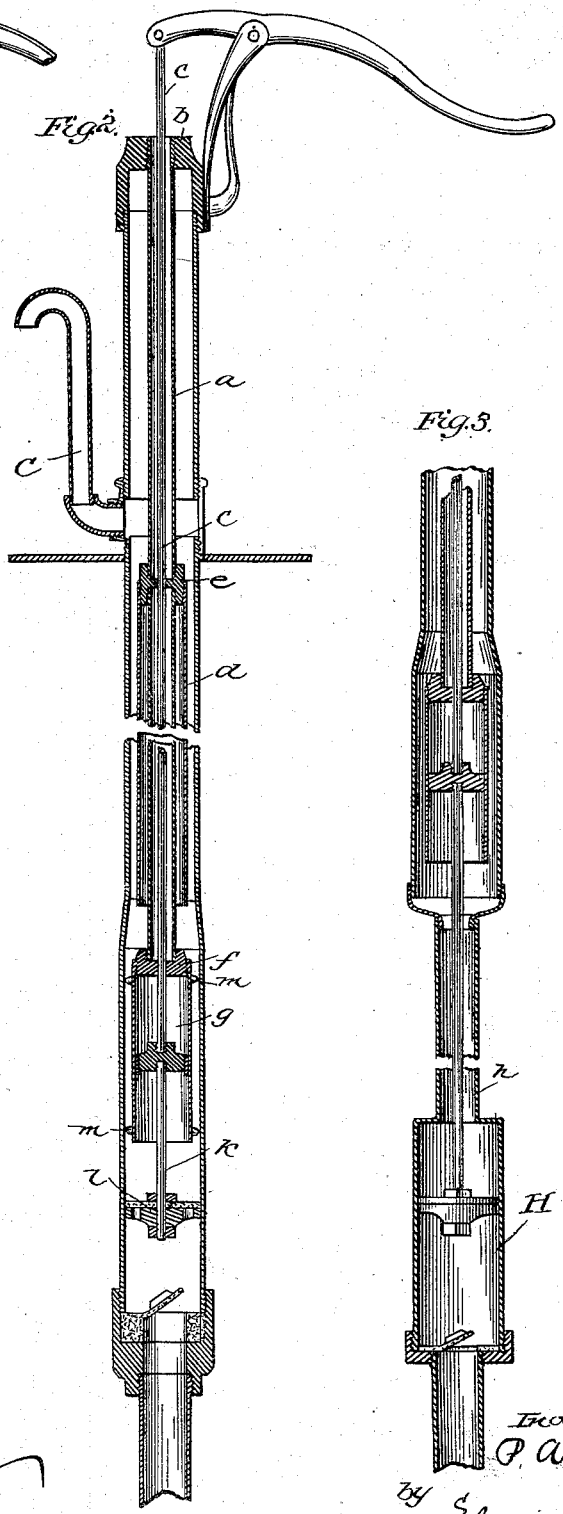

Fig. 3.

Attest:

Walter Donaldson

F. L. Middleton

Inventor:

P. A. Myers

by Ellis Spear

Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

PHILIP A. MYERS, OF ASHLAND, OHIO, ASSIGNOR OF ONE-HALF TO FRANCIS E. MYERS, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 263,944, dated September 5, 1882.

Application filed June 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, PHILIP A. MYERS, of Ashland, in the county of Ashland and State of Ohio, have invented a new and useful Improvement in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention is an improvement in force-pumps.

The object of the invention is principally to so construct and organize the air-chamber and the submerged or forcing cylinder of a force-pump that the whole may be contained within the pipe and adapted for use in an ordinary bored well or well of small diameter.

My object is also to simplify the construction of the pump, and although it is designed principally for bored wells, it may be advantageously applied to general house and windmill use in open wells.

In the form which I have hereinafter shown I have represented the pump with the larger and smaller pistons and cylinders operating upon the principle shown in Letters Patent granted me on the 28th day of February, 1882, No. 10,048, and this is the preferred form of pistons and cylinders with which I embody my invention; but the invention in all its parts is not necessarily confined to this particular form of pistons and cylinders.

In the accompanying drawings, Figure 1 shows a side elevation of the pump; Fig. 2, a central longitudinal section of the same; Fig. 3, a modification for deep wells.

In these drawings the pump-barrel is represented at A. It is made preferably of ordinary tubing. It may also be of the same diameter as the cylinder B, of which it forms a continuation in direct line; but it may, if preferred, be reduced in size, as shown in Figs. 1 and 2, from a point above the cylinder B. Within this pump-barrel I place a central tube, *a*, which may be made of ordinary gas-pipe. It is fixed to the cap *b* of the pump-barrel by having its upper end threaded and screwed into a hole tapped through the center of the cap. It is required only that the bore of this pipe *a* shall be large enough to admit the free play of the piston-rod *c*. At a proper point upon the pipe *a*, on its extension into the cylinder, I fix a cylindrical air-chamber, *d*. This is held to the pipe by means of a tubular cap-piece, *e*, having a threaded bore, to which cap-piece the cylinder *d* is screwed or otherwise fixed. This cylinder may be of thin metal, as it is held securely in place by means of the cap-piece. It forms the lower air-chamber of the pump, and may be of any desired length, such length being proportioned to the length of the pump. The tube *a* extends through this cylinder, projecting below it a suitable distance, and to its lower end is screwed another tubular cap-piece, *f*, to which is fixed a submerged piston-cylinder, *g*, also of thin metal, and held securely in its place by the cap-piece *f*. The air-cylinder *d* and the submerged cylinder *g* are slightly less in exterior diameter than the interior diameter of the main pipe or cylinder in which they are located, leaving an annular water-space all around them. The piston-rod *c* extends through the pipe *a*. It is connected with the piston or plunger *k* in the submerged cylinder and with the lift-bucket *e*, of larger diameter than the plunger and working tight in the lower part of the cylinder B. The ordinary suction-pipe, with its valve, is attached to the lower part of the cylinder B in the usual manner.

The discharge-spout C is of ordinary construction, and is located at any convenient place on the pump-barrel. Preferably I make and place it as shown, thereby leaving an ample air-space above the spout-opening of the barrel.

The cap *b* is fitted air-tight to the upper end of the pump-barrel, and the upper end of the pipe *a* has also air-tight connections with the cap *b*.

The handle is of ordinary construction.

It will be apparent from the construction described that when the piston is operated by the handle or in any convenient way, and the lift-bucket and piston thereby set in operation, water will be forced from between the lower ends of the submerged cylinder and the lift-bucket into and through the annular space around the submerged cylinder, and also up through a like annular space around the air-cylinder *d*. When thus forced up it acts against the air within the air-cylinder. It also

as it rises acts against the air contained in the pump-barrel above the spout-opening, so that immediately after the stroke the reaction of the air in the upper part of the pump-barrel is against the top of the column of water forcing it down. At the same time the reaction of the air within the air-chamber presses against the column of water at a point lower down and forces the column of water up. This gives a large amount of reaction and a very even flow of water. At the same time both air-chambers are compactly arranged within the same tubular structure, and no packings are required.

It will be observed that both the cylinder *d*, which constitutes the lower air-chamber, and the submerged cylinder *g*, are suspended by the pipe *a*, in which the piston works. This gives a very simple and cheap construction. The cylinder *g*, as well as the upper cylinder are held in central position by the piston-rod itself, which, of course, is guided by the lift-bucket, while the upper plunger maintains the submerged cylinder in a central position. For additional security I fix upon the outer surface of the submerged cylinder, at its upper and lower ends, small studs *m m*, which bear against the inner surface of the cylinder B.

With this construction, as above described, I may use for the cylinder B pipe three inches (more or less) in diameter, which is adapted to bored wells, and by this means I avoid any necessity for enlarging the upper part of a bored well, and thereby forming a cavity liable to catch the surface-water and turn it into the well.

It will be apparent that the cylinder B may extend downward to any desired depth.

The same structure, though specially adapted to bored wells, is so simple and compact that it may be advantageously used in open wells for general house and windmill use.

In Fig. 3 I have shown a form of the lower end of the pump adapted to deep wells. In this I do not extend the full-sized pipe B down to the cylinder of the lift-bucket, but provide a separate cylinder, H, connected to the lower end of the main cylinder by a pipe, *h*, through which the stem extends, connecting the larger lift-bucket to the piston above. In this case the displacement of the water by the upward motion of the bucket is the same; but there is a saving in the size of the pipe. The suction-pipe is of course fixed to the lower end of the lift-bucket cylinder, as in the form before shown.

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

1. In a force-pump and in combination, a central tube in the main pipe or cylinder, a piston-rod working in said tube, an air-chamber suspended in said main pipe or cylinder, and suitable forcing piston or pistons and valves, substantially as described.

2. In a force-pump and in combination, a central tube connected to the upper part of the pump, a piston-rod working in said tube, an air-chamber placed upon said tube, with a space between its surface and the inner surface of the pump, a submerged cylinder fixed to the lower end of said tube, with a water-space between its surface and the inner surface of the pump-cylinder, and a piston working in said cylinder connected to the piston-rod, substantially as described.

3. In a force-pump and in combination, a central tube connected by an air-tight central joint to the pump-cap, leaving an annular closed space in the tube of the pump, a piston-rod working in said tube, and a submerged cylinder connected to the lower end of said tube and having a water-space between said cylinder and the inner surface of the pump-cylinder, a piston working in said submerged cylinder, and a lift-bucket, all substantially as described.

4. In a force-pump and in combination, a central tube connected by an air-tight central joint to the pump-cap, a piston-rod working in said tube, and an air-chamber placed upon said tube, with an annular space between its surface and the inner surface of the pump-cylinder, and suitable piston or pistons and valves, substantially as described.

5. In a force-pump having a central tube, *a*, a submerged cylinder suspended therefrom, a central piston-rod, *c*, and piston working in said submerged cylinder, and a stem and lift-bucket connected to said piston-rod, a separate lift-bucket cylinder, H, and intermediate pipe, *h*, substantially as described.

6. In a force-pump having a straight barrel or cylinder without offsets, adapted to a bored well, a submerged piston-cylinder connected to a pipe within the main cylinder and having a water-space between its periphery and the inner surface of the main cylinder, a piston working in the submerged cylinder, and a lift-bucket working in the main cylinder, whereby the water is forced up past the submerged cylinder and within the main cylinder to the discharge-spout, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PHILIP A. MYERS.

Witnesses:

E. N. HARONOT,

R. M. CAMPBELL.