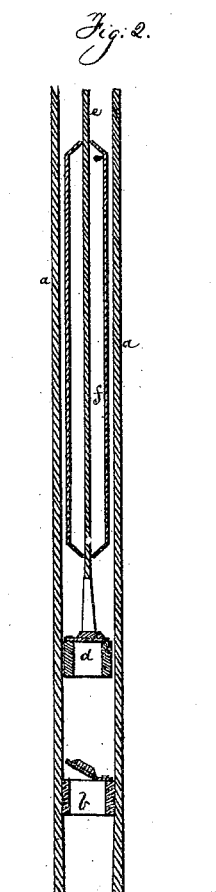
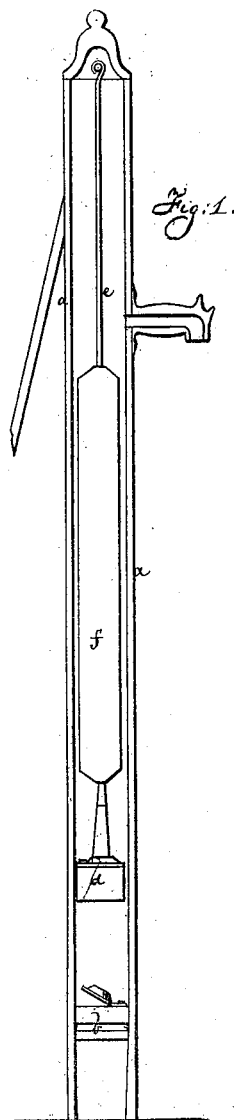


J. Renfren,
Pump Lift,
No. 4,580, *Patented June 16, 1846.*



UNITED STATES PATENT OFFICE.

JOHN RENFREW, OF FAYETTEVILLE, PENNSYLVANIA.

PUMP FOR RAISING WATER.

Specification of Letters Patent No. 4,580, dated June 16, 1846.

To all whom it may concern:

Be it known that I, JOHN RENFREW, of Fayetteville, in the county of Franklin and State of Pennsylvania, have invented a new and useful Improvement in Lifting-Pumps for Raising Water; and the following is a full, clear, and exact description of the principle or character thereof which distinguishes it from all other things before known, and of the manner of making, constructing and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of a single pump with one half the barrel removed to exhibit the internal arrangement, and Fig. 2, a vertical section taken through the pump box and rod.

The same letters indicate like parts in all the figures.

It is well known that in the ordinary lifting pump all the force necessary to lift the column of water, pump rod, &c., must be exerted during the upward stroke, the return stroke being accomplished by the weight of the rod, &c.; this is admitted to be defective. The object of my improvement is to equalize, or nearly so, the force required to work the pump, which I effect by attaching a hollow float to the pump rod above the piston or pump box, the buoyancy of which in the water will aid in giving the upward stroke, and from its capacity will reduce the area of the column to be lifted.

In the accompanying drawings (*a*) represents the barrel of the pump, (*b*) the induction valve at the lower end to admit the water, and (*d*) the pump box or piston con-

nected with the lever or handle by means of the rod (*e*). So far all these parts are old and well known, and do not require to be particularly described. On the rod (*e*) and above the piston (*d*), there is a hollow cylindrical air tight vessel (*f*), which may be made of thin sheet metal with the ends conical and perfectly air tight, it is so much less in diameter than the bore of the barrel as to leave a space between the two whose area shall be a little greater than the area of the aperture through which the water passes in the valved piston, so that instead of lifting at each stroke the weight of a column of water of the entire diameter of the bore and discharging an amount only equal to the stroke of the piston and the diameter of the valved aperture in the piston, the weight lifted will be equal only to the quantity discharged aided by the buoyancy of the float or hollow air tight vessel (*f*); it is not however pretended that this power is saved, but merely transferred to the down stroke of the piston to equalize the power for then the buoyant vessel has to be forced down through the water with a force equivalent to that which it communicated to the upward stroke.

What I claim as my invention and desire to secure by Letters Patent is—

The employment of a float or air tight vessel within the barrel of a lifting pump and attached to the piston rod, for the purposes and in the manner substantially as herein described.

JOHN RENFREW.

Witnesses:

WM. H. BISHOP,
A. P. BROWNE.