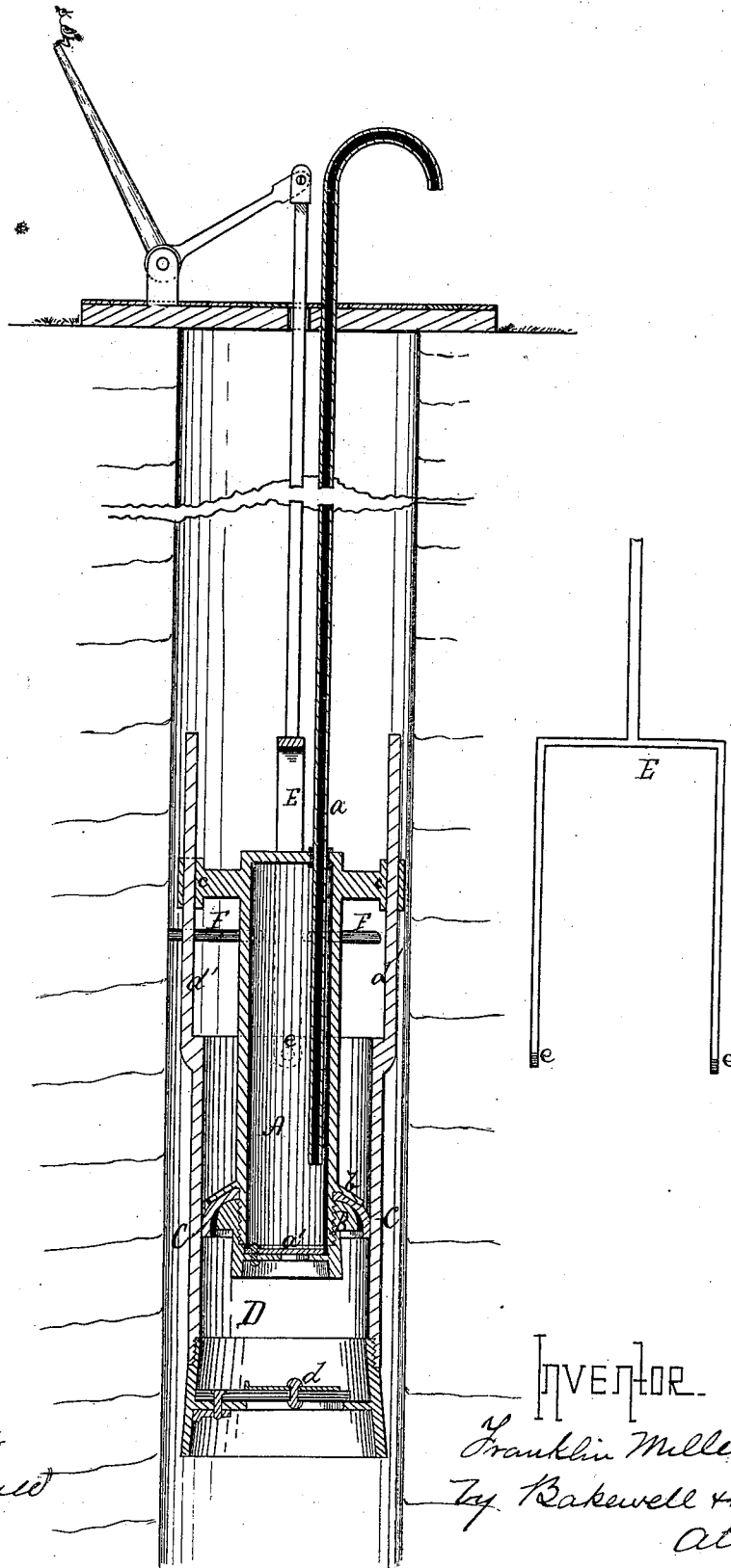


FORCE AND LIFT PUMP.

Patented May 9, 1876.



WITNESSES.

James I. Kay
R. W. Wenshall

Inventor

Franklin Miller
By Bakewell & Kerr
Atty

UNITED STATES PATENT OFFICE.

FRANKLIN MILLER, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN FORCE AND LIFT PUMPS.

Specification forming part of Letters Patent No. **177,143**, dated May 9, 1876; application filed March 7, 1876.

To all whom it may concern:

Be it known that I, FRANKLIN MILLER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Force and Lift Pumps; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming a part of this specification, and which is a vertical section of a pump embodying my invention.

My invention relates to the construction of force and lift pumps, wherein the discharge-pipe, or a fixed cylinder having suitable valves, telescopes with an outer valve-cylinder; and consists in making the inner diameter of the outer or telescoping cylinder to exceed that of the fixed cylinder to such an extent as will permit the interposition of a flexible packing, which obviates the friction incident to the telescoping of close cylinders, thus increasing the capacity and reducing the power requisite to operate the pump; and also in combining with the fixed and movable cylinders a series of guides, for preserving the concentricity of the cylinders without contact thereof.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawing, A indicates a fixed air-chamber, which may be of any approved form; and *a*, the discharge-pipe, extending down nearly to the bottom of the air-chamber, and constituting the dip-pipe common to such devices. *b* is an annular shoulder or ring formed on or secured to the lower end of air-chamber A, and B is a threaded ring, carrying the air-chamber valve *a'*. C is a washer, of leather or other flexible suitable material, which is clamped between the shoulder *b* and ring B, when the ring is screwed on the end of the air-chamber, said washer serving to pack the telescopic cylinder D.

D is a cylinder, open at one end and closed at the opposite end, but provided with a valve, *d*, which opens inward. Said cylinder slides upon or telescopes with the air-chamber A, and is provided with guides *d'*, which pass through eyes *e* on the air-chamber A; or like provision is made to preserve the relative position of the cylinder D.

E is a yoke fastened to the cylinder D, as

at *e e*, and affording a means for attaching rods or like devices for reciprocating the cylinder.

The air-cylinder A or discharge-pipe is bolted or otherwise secured to a frame, F, by means of which it is suspended, in such a manner as to entirely submerge the cylinder D, though the devices will operate when D is only partially submerged.

The operation of these devices is as follows: On the descent of cylinder D the valve *d* in the bottom thereof opens and the liquid enters, instantly filling the cylinder, the weight and momentum of the cylinder aiding the operation. Upon the reverse movement of the cylinder the valve *d* closes, and the telescoping of the cylinders lifts the air-chamber valve, and forces the contents of cylinder D into the discharge-pipe or air-chamber. Upon the descent of cylinder D the upper valve is shut by the weight of the liquid column above it, the lower cylinder fills, as before, and the several operations are repeated as often as the cylinder D is reciprocated.

Whenever desired the air-chamber may be omitted, when, of course, the cylinder D will telescope with the lower part of the discharge-pipe, and a suitable valve will be required to take the place of the valve shown in the lower end of air-chamber A.

As the washer C moves loosely in the cylinder D it will offer no resistance to the descent of the cylinder, but will be distended by liquid during the ascent of the cylinder, and form an effectual packing.

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

1. The combination of the discharge-pipe or fixed cylinder, the movable valve-cylinder, substantially as described, and the interposed flexible packing C, secured to the fixed cylinder or discharge-pipe, for the purpose specified.

2. The combination of the discharge-pipe or fixed cylinder, having the interposed packing, the movable valve-cylinder, and the guides, substantially as and for the purpose specified.

In testimony whereof I, the said FRANKLIN MILLER, have hereunto set my hand.

FRANKLIN MILLER.

Witnesses:

F. W. RITTER, Jr.,
JAMES I. KAY.