(No Model.)

C. E. KETCHAM

PUMP.

No. 250,819. Patented Dec. 13, 1881.

Fig. 1.

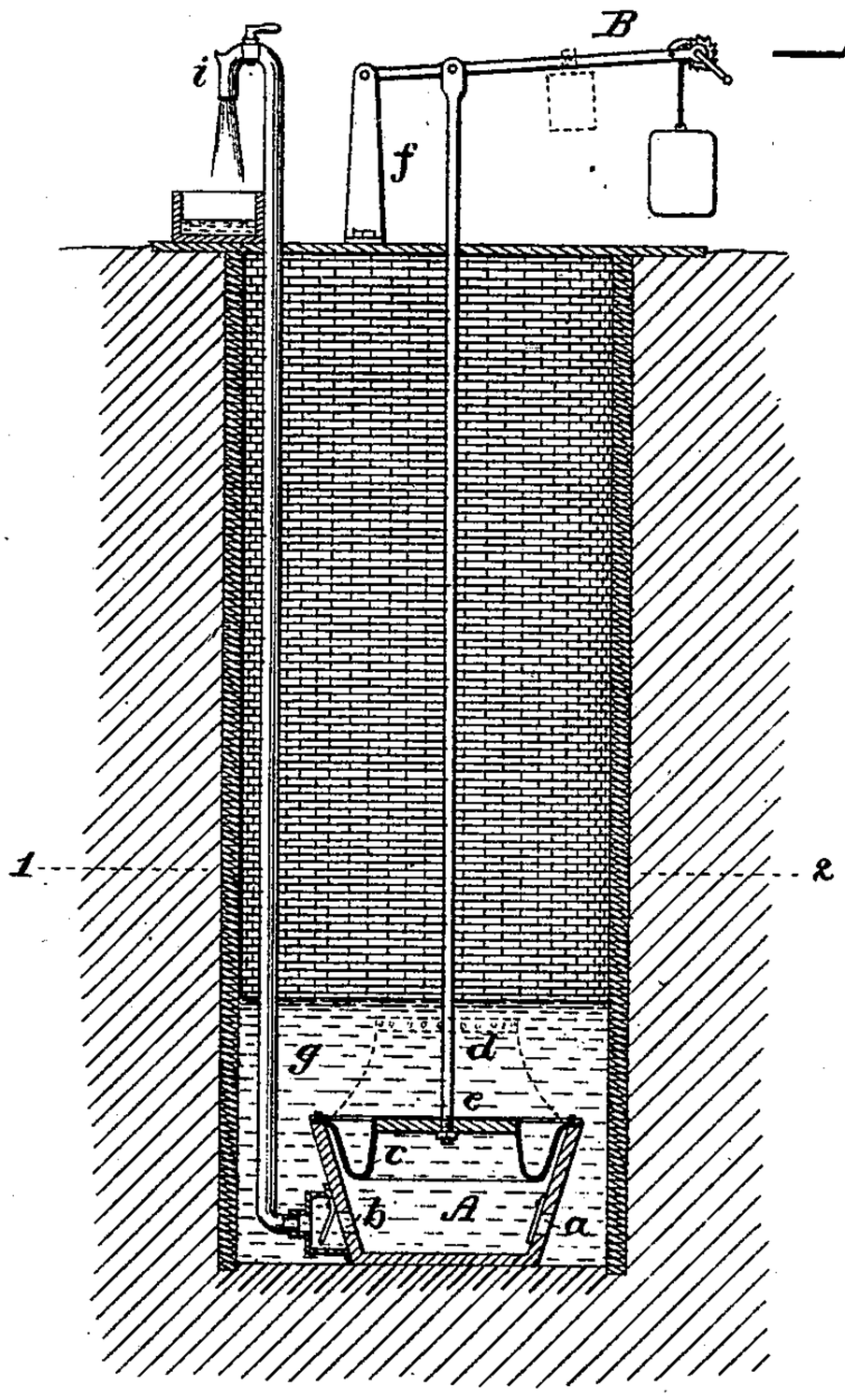
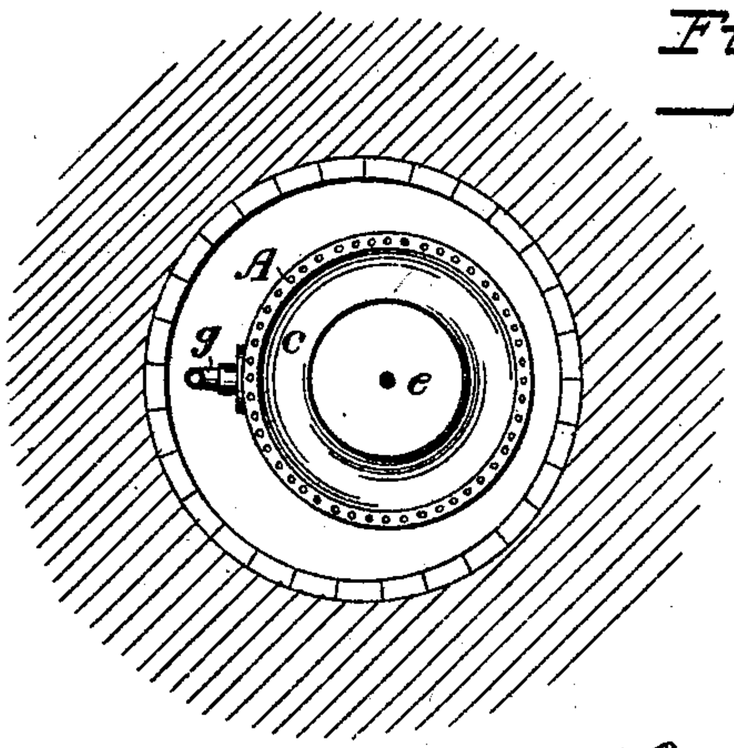


Fig. 2.



Attest:
Courtney A. Cooper.
William Paxton.

C. E. Ketcham
By his attorney
Charles E. Foster

UNITED STATES PATENT OFFICE.

CHARLES E. KETCHAM, OF FAIRPORT, VIRGINIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 250,819, dated December 13, 1881.

Application filed September 15, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. KETCHAM, of Fairport, Northumberland county, Virginia, have invented an Improvement in Pumps, of which the following is a specification.

My invention is a water-elevator constructed as fully described hereinafter, so as to secure the constant flow of a body of water without the necessary constant effort of the operator, with a minimum of power, and with but little of the friction resulting in the use of ordinary pumps.

In the drawings, Figure 1 is a sectional elevation of my improved water-elevating apparatus. Fig. 2 is a plan view of the receiver.

My improved apparatus consists of a receiver with a diaphragm and inlet and outlet ports and valves, and appliances for operating the diaphragm.

The receiver A is a vessel of any suitable form and dimensions, advantage resulting from making the same of great capacity in comparison with the cylinders of ordinary pumps. This vessel has an inlet-port, *a*, provided with a valve opening inward, and an exit-port, *b*, provided with a valve opening outward, and with a diaphragm, *c*, of rubber, leather, impervious canvas, or other flexible water-proof material.

The operating appliances may be of any character suitable to impart a reciprocating motion to the diaphragm *c*. Thus, a rod, *d*, of wood or other light stiff material, may be connected to a disk, *e*, at the center of the diaphragm, and to an operating-lever, B, pivoted to a standard, *f*, so that as the lever is worked the diaphragm will be carried into and out of the vessel.

The receiver should preferably occupy a position immersed a considerable depth in the water to be elevated—as, for instance, at or near the bottom of a well—a pipe, *g*, leading from the exit-port *b* to the surface. As thus arranged, the elevation of the diaphragm will allow the water to flow easily, and with but little exertion by the operator, into the receiver through the inlet-port. When the diaphragm is depressed the inlet-valve will close and the water will flow through the exit-port to the surface.

By making the receiver of a great capacity the outward flow of water may be continued for a considerable time without again elevating the lever, so that a weight, W, hung on the latter, may be made the means of insuring a constant discharge without further labor or attendance by the operator, who can regulate the flow by a cock, *i*.

It is obvious that the use of an ordinary cylinder and piston of such a size as would secure this result would not be practicable, owing to the friction at the periphery of a piston of such large diameter compared with the possible extent of the movement attainable by a lever. I therefore employ the flexible diaphragm, which operates without friction, and moreover is not liable to get fouled and stuck in the vessel, as a piston will in a cylinder when the latter is immersed in a body of water. Moreover, the pressure upon the diaphragm being equal upon both sides permits it to be elevated and the receiver to be filled with the use of but little power.

A most important advantage from employing a diaphragm secured to a disk, *e*, nearly equal in diameter to the vessel, and to the sides of the vessel, as shown, is the increased capacity of receiver thereby secured—for it will be seen that when the diaphragm is elevated, as in dotted lines, Fig. 1, the capacity of the receiver is nearly double that of the vessel, while the descent of the diaphragm to its lowest position almost completely expels the entire body of water, so that one movement of the diaphragm of a ten-gallon cylinder will discharge twenty gallons of water.

The weight may be suspended to the lever by a cord wound on a drum by means of a crank-handle, so that the weight may be lowered to raise the lever, and then raised with but little exertion by the operator.

It will be apparent that a water-elevator of so simple a construction may be built and conveniently used where it would not be possible to make and employ metal pumps, and that said elevator may be used for various purposes.

I claim—

1. The combination, in a fluid-elevator, of a vessel provided with inlet and outlet ports and valves, a disk, *e*, nearly equal in diameter to the vessel, and operating appliances and a

flexible diaphragm, *c*, secured to the vessel and to the disk, and equal in length to the depth of the vessel, substantially as described.

2. The combination, with the receiver, flexible diaphragm secured to the rod *d* and lever B, and to the receiver, of a weight suspended by a cord, and drum upon the lever for elevating the weight, substantially as set forth.

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

C. E. KETCHAM.

Witnesses:
CHARLES E. FOSTER,
WILLIAM PAXTON.