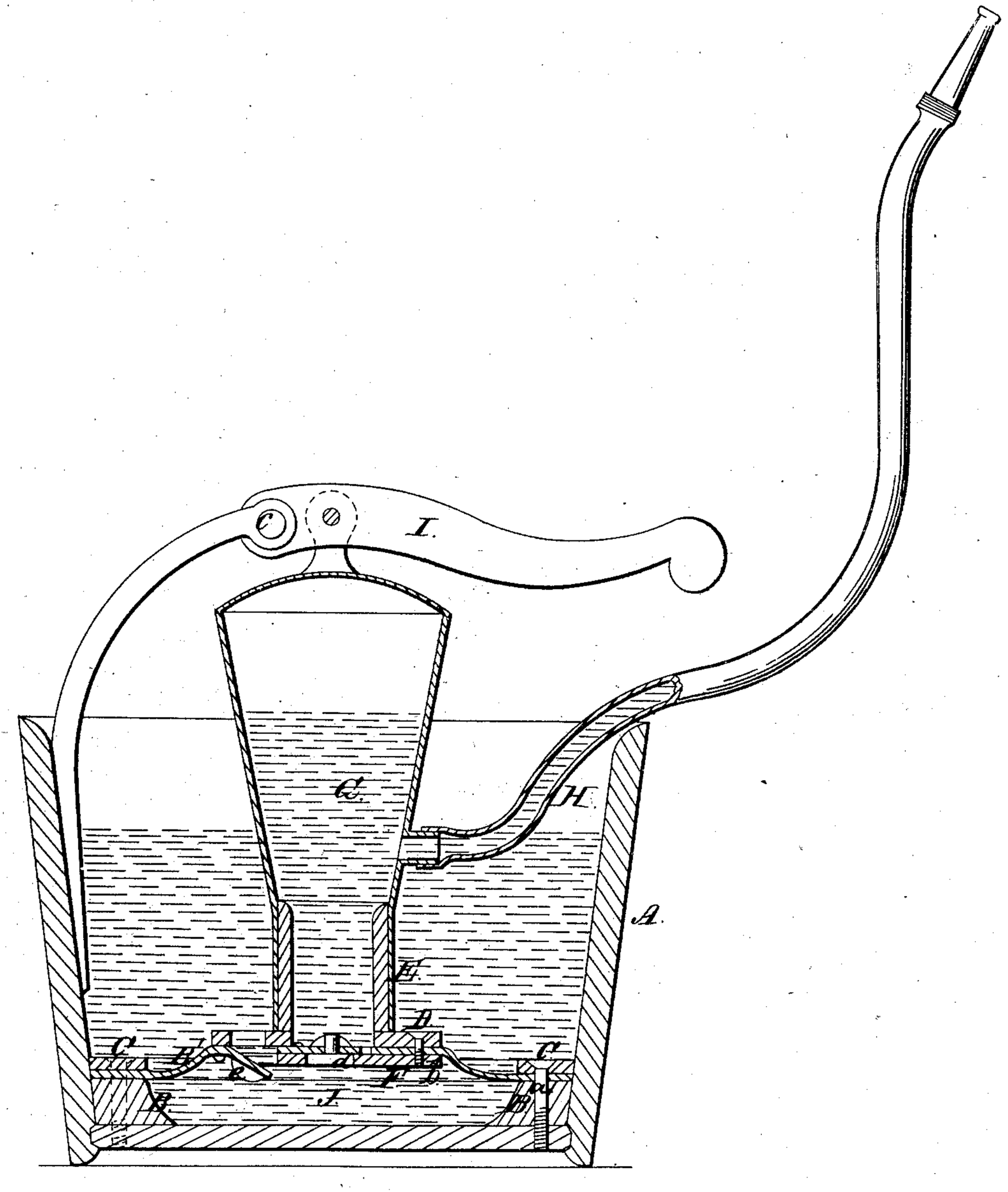
I. S. Burnham,

Force Pump.

No. 16,373. Patented Jan. 13, 1857.



UNITED STATES PATENT OFFICE.

JAMES S. BURNHAM, OF YORKVILLE, NEW YORK.

PUMP.

Specification of Letters Patent No. 16,373, dated January 13, 1857.

To all whom it may concern:

Be it known that I, J. S. BURNHAM, of Yorkville, in the county of New York and State of New York, have invented a new and improved pump, designed more particularly for a portable pump to be used for watering gardens, the washing of windows, syringing green-house plants, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of this specification, said drawing being a vertical section of my improvement.

My invention relates to that class of pumps in which a flexible or elastic diaphragm is used; the pumping being effected by vibrating the diaphragm, which is provided with valves.

My invention consists in combining an air-chamber directly with the diaphragm, or, in other words, causing the air-chamber to ride upon the diaphragm.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A represents an ordinary water pail having an annular wooden strip B secured to its bottom, said strip adjoining the inner side of the pail as shown clearly in the drawing.

B′ represents a diaphragm composed of a circular piece of leather or other suitable pliable material, the edge of which is secured to the upper surface of the wooden ring B by screws (*a*) which pass through an annular plate C on the ring B and through ring B into the bottom of the pail, the edge of the leather being secured between the plate C and ring B.

D represents a circular plate having a socket chamber E at the center of its upper surface, the plate D leaving an opening through its center in line with the socket E. A plate F is placed on the under side of the leather B′ and the two plates D, F, are secured together by screws (*b*) the leather B′ being between them. The two plates are considerably smaller in diameter than the leather as plainly shown in the drawing.

G is an air vessel placed on the upper part of the socket or chamber E and communicating with it.

H is the force pipe, communicating with the air vessel just above the socket or chamber E.

I represents a lever or handle attached to the upper part of the air vessel, the fulcrum of the lever or handle being at (*c*).

At the center of the leather B′, and in line with the socket or chamber E, a valve (*d*) is placed. This valve opens upward, and a valve (*e*) opening downward is placed in the leather B′ between the two plates D, F, at one side of the socket or chamber E.

The valve (*e*) when open affords a communication between the pail and the chamber J below the leather B′, and the valve (*d*) when open affords a communication between the chamber J and the chamber E and air vessel G.

The leather is made rather full at its center, or in other words, is of slightly dish form, so as to allo wthe air vessel and socket a certain degree of vertical play, the operation will be readily seen. The pail A is filled with water, and the air vessel G and chamber E, is raised and lowered by operating the handle or lever I. As the leather B′ rises the valve (*e*) opens and the water passes down through said valve into the chamber J. As the leather is depressed the valve (*e*) closes and the valve (*d*) opens, the water in the chamber J being forced up through the valve (*d*) through the chamber E into the air-vessel G and out through the pipe H. After the first few vibrations of the leather, the air will be sufficiently compressed within the air vessel to cause a continuous stream to flow from the pipe H.

Among the advantages of the above invention are, that the valves, (*d*) (*e*) will always be in working order, except when actually worn out, because being immersed in water the working of the pump cannot be affected as in atmospheric pumps by the looseness of the valves and the admission of air. The valves being both placed in the leather B′ they can be renewed without difficulty when worn out by merely detaching the leather and adjusting new ones to it. The pump may also be constructed at a trifling cost; there are no parts liable to get out of repair and it may be applied to wells or cisterns if desired by having a rigid tube or pipe of requisite length constructed of wood or metal put in the place of the chamber or socket E so that the air-vessel and handle or lever may be at the surface of the well.

The diaphragm in pumps of this description is usually vibrated by means of a separate plunger, the air-vessel being stationary, with a flexible tube or pipe leading to the air-vessel. By combining the air-chamber with or upon the diaphragm, and by vibrating the diaphragm by giving motion to the air-chamber, in the manner described, a great saving is effected in the number of parts, the apparatus is rendered much cheaper and is far more compact.

I would here remark that I distinctly disclaim the pumping of liquids or other substances by means of a flexible diaphragm, as pumps of this description are very old; I also disclaim the placing of pump-valves under water, or arranging them in any particular manner; I disclaim everything heretofore known in connection with diaphragm pumps; I also expressly disclaim the use of an air-vessel in diaphragm pumps. I confine myself exclusively to the combination of the air-chamber directly with the diaphragm so that the air-chamber rides upon the diaphragm, as shown. By this arrangement the diaphragm is operated by giving motion to the air-chamber, and, under all circumstances, the air-chamber rises and falls with the vibrations of the diaphragm. By thus combining the air-chamber directly with the diaphragm, I gain a great advantage in compactness, dispense with a number of parts required in other pumps, and thus simplify the machine, reduce its cost, and increase its utility.

In the patent of McPherson and Joyce, 1856, a corrugated diaphragm is used, vibrated by a plunger. I claim no such device; neither is my invention, viz, an air-chamber riding upon the diaphragm, anywhere shown in that patent.

In the application for a patent of Hyzer and Parks, 1856, rejected, an ordinary pump is employed; the valves being placed under water. As before stated, I disclaim all such devices.

I am aware that in Chapman Warner's patent, July 7, 1856, the air chamber is attached to and moves with the piston and I therefore disclaim a movable air chamber.

What I claim as new in diaphragm pumps and desire to secure by Letters Patent, is:

Combining the air-chamber, G, directly with the diaphragm, B′, so that the air-chamber rides upon the diaphragm, in the manner and for the purposes herein set forth.

JAMES S. BURNHAM.

Witnesses:

JAMES F. BUCKLEY,

WM. TUSCH.