(No Model.)

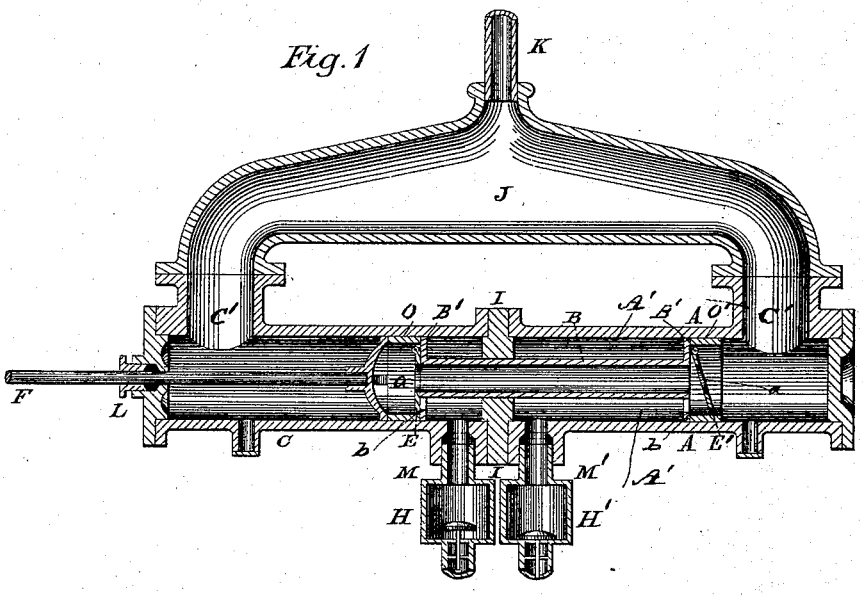
H. M. CLOSE.

PUMP.

No. 384,678. Patented June 19, 1888.

Fig. 2

Fig. 1



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UNITED STATES PATENT OFFICE.

HENRY M. CLOSE, OF BEAVER FALLS, PENNSYLVANIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 384,678, dated June 19, 1888.

Application filed April 13, 1887. Serial No. 234,680. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. CLOSE, a citizen of the United States, residing at Beaver Falls, in the county of Beaver, State of Pennsylvania, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in pumps, and more particularly to improvements on an invention made by me for which an application for a patent was filed of even date herewith, Serial No. 234,679.

In the application above referred to the neutral cylinder which operates to balance the liquid is provided with separate and independent neutral or balance heads, said balance-heads being operated to open and close the ends of the cylinder alternately; and the object of this invention is to dispense with the oscillating neutral valves or balance-heads on the ends of the neutral cylinder, described in the application above referred to, thus making the construction of the pump more simple and more applicable and effective for certain purposes.

My present invention, therefore, consists in dispensing with the balance-heads and allowing the columns of liquid within the main cylinder and within the neutral cylinder to rest unobstructed against themselves, which effectually balances the piston at any point.

Referring to the drawings, Figure 1 is a vertical longitudinal sectional view of the pump. Fig. 2 is an end view of one of the suction-heads of the neutral cylinder.

A indicates the outside cylinder or casing, in which is located the neutral cylinder and other working parts of the pump, said cylinder being divided into two chambers by the partition I, which is provided with an opening through which the said neutral cylinder is adapted to move back and forth.

B is a neutral cylinder adapted to work back and forth through the partition I, as has already been stated, and in the chambers of the cylinder A, said cylinder being somewhat smaller in diameter throughout the greater part of its length than the internal diameter of the outside cylinder or casing, A, so as to leave a chamber, A′, on each side of the partition between the outer walls of the cylinder and the inner walls of the casing, the ends of the cylinder being enlarged, as shown at O and O′, so as to fit snugly within the casing A.

E and E′ are valves pivoted or otherwise secured to the enlarged ends of the neutral cylinder, said valves being provided with a central opening, *a*, of the same size as the internal diameter of the neutral cylinder, which permits the water or other liquids to pass back and forth through the said cylinder. The flanges B, which form the enlarged portions of the ends of the cylinder, are provided with apertures *b*, through which the liquid from the supply-pipes M M′ passes to the interior of the cylinder A, said apertures being opened and closed by the valves E and E′ when the cylinder is moved back and forth, said cylinder being connected to the piston-rod F, which passes through suitable stuffing-boxes or glands, L.

Each end of the cylinder or casing A is provided with pipes C′, to which is connected the dome J of the pump, and K is the discharge-pipe leading therefrom. Instead of using the dome J, with its two branches connecting with openings in the ends of the cylinder, I may continue the pipes C′ to any distance, and have two discharge-pipes, K, instead of one. As before indicated, M and M′ are pipes connecting the two chambers of the cylinder or casing A with the water or other liquid to be raised, said pipes being provided with suitable valves, H and H′. It will be noticed that the valves E and E′ act alternately as suction-valves, and are alternately raised to open the ports *b*, so that the liquid to be raised can pass up through the corresponding pipe, M or M′, to the interior of the cylinder, while at the same time the valve at the other end of the cylinder is forced down by the weight of the column of water in the dome J, thus closing the port at this end of the piston.

By having the ends of the piston open and allowing the columns of liquid to be unobstructed the columns of water or other liquid will sustain each other. When suction-valves E or E′ are open, the column of water rests alternately on one or the other of the check-valves H or H′ below the pump as the lowest point of resistance.

Having thus described my invention, what I claim is—

1. In a device for transferring liquids from

a lower to a higher level, a double-chambered cylinder having inlet and outlet ports in each chamber, a hollow neutral cylinder or piston of smaller diameter, except the heads, which fit the main or double-chambered cylinder, and valves located in the heads of the piston to open and close the ports, said valves being provided with a central opening, so as to leave the neutral cylinder open, as described, whereby the columns of water will rest against each other within the piston or neutral cylinder to balance the same at any point within the main or double-chambered cylinder, as set forth.

2. In a device for raising liquids from a lower to a higher level, a double chambered cylinder having outlet-pipes at each outer end and inlet-pipes at each inner end of said chambers, and a neutral cylinder or hollow piston provided with valves, as described, and of smaller diameter, except the ends thereof, working within said cylinder, the ends of the piston being open and provided with valves which open and close alternately at each stroke of the neutral cylinder or piston to admit or shut off the water-supply from the space around the piston to the double chambers of the cylinder, as set forth.

3. In a device for transferring liquids from a lower to a higher level, a double-chambered cylinder having inlet and outlet pipes in each chamber, and a hollow neutral cylinder or piston of smaller diameter, except the heads, working within the double-chambered cylinder, the outlet-pipes being open or free from valves, as described, whereby the columns of liquid above the piston will rest against each other within the piston, as set forth.

4. In a pump of the character described, the combination of the double cylinder A and the hollow open-ended neutral cylinder or piston B, reduced between the heads to form a chamber on each side of the partition in the main cylinder, said neutral cylinder or piston being provided with the valves E and E′, with the supply-pipes M M′, pipes C′, and dome or exit-pipe J, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY M. CLOSE.

Witnesses:
S. S. McFERRAN,
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