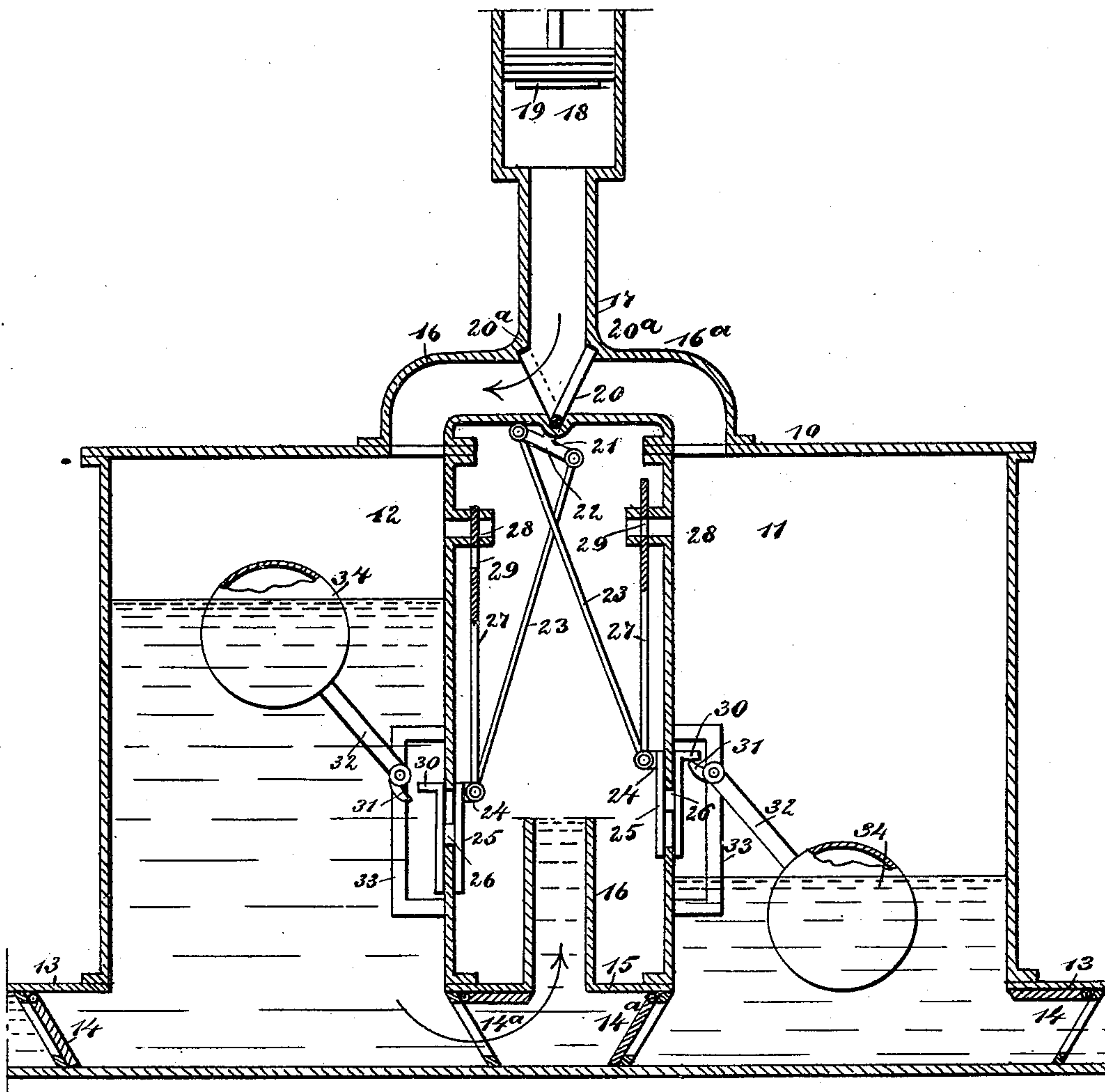


(No Model.)

M. M. GROVE.
PUMP.

No. 481,022.

Patented Aug. 16, 1892.



WITNESSES:

Donn Twitchell
E. M. Clark

INVENTOR:

M. M. Grove
BY *Munn & Co*
ATTORNEYS

UNITED STATES PATENT OFFICE.

MELCHI M. GROVE, OF GARFIELD, WASHINGTON.

PUMP.

SPECIFICATION forming part of Letters Patent No. 481,022, dated August 16, 1892.

Application filed December 7, 1891. Serial No. 414,262. (No model.)

To all whom it may concern:

Be it known that I, MELCHI M. GROVE, of Garfield, in the county of Whitman and State of Washington, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

My invention relates to improvements in pumps; and the object of my invention is to produce a simple form of pump which may be partially submerged in water and which, by means of an air-pressure applied to the chambers thereof, will pump water rapidly. The pump shown may be adapted for any ordinary pumping purposes, but is especially intended for use in irrigation.

To this end my invention consists in certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure is a broken vertical cross-section of the pump embodying my invention.

The pump 10 is provided with two similar parallel chambers 11 and 12, which are connected as described below, and each of which is provided near the bottom with an inlet-pipe 13, in which is a common flap-valve 14, the valve being arranged to prevent the water from passing out of the chamber through the inlet-pipe after it has once entered. The two chambers are provided with a common outlet-pipe 15, in which are valves 14^a, arranged to prevent the return of water to the chambers, and this pipe 15 opens into a delivery-pipe 16, which may be made to deliver the water to any desired point.

The chambers 11 and 12 are connected at the top by a U-pipe 16^a, which has a pipe 17 opening from its central portion, and which connects with a common form of air-pump 18, provided with the usual form of plunger 19. I have not shown the detailed construction of this pump, as any form of air-pump may be used which will force sufficient air into the chambers 11 and 12.

Beneath the pipe 17 and in the pipe 16^a is a swinging valve 20, which is adapted to fit against the seats 20^a on opposite sides of the mouth of the pipe 17, and the valve when tipped will consequently direct the air into one of the chambers 11 and 12 and shut it off

from the other chamber. This valve 20 has a crank 21, which is secured centrally to a walking-beam 22, and the walking-beam has pivoted to its opposite ends the rods 23, which cross, as shown, and each of which is pivoted at its lower end to an ear 24 on the slide-block 25. There is a slide-block 25 for each chamber, and the slide-blocks are held to move in the recesses 26 in the walls of the chambers. Each slide-block 25 also connects with a plate 27, which extends upward and serves as a valve, the plate moving vertically through an air-pipe 28, which opens from the upper part of the chamber, and the plate 27 is provided with an opening 29, which may register with the bore of the pipe 28 and permit the escape of air from the chamber.

The slide-blocks 25 have on their inner sides and near their upper ends flanges 30, which are adapted to be moved by a toe 31 of the lever 32, and each chamber 11 and 12 is provided with one of these levers, the levers being pivoted in a frame 33, secured to the chamber-walls. Each lever 32 terminates at its outer end in a float 34, which is hollow, and which also serves as a weight. It will be seen that the float 34 will be raised by the incoming water in a chamber, thus freeing the toe 31 from contact with the flange 30 and permitting the adjacent slide-block 25 to descend, and when the water flows out of the chamber the float 34 will drop and the toe 31, engaging the flange 30, will raise the block 25 and move the plate 27, so as to bring the opening 29 opposite the bore of the air-pipe 28.

The operation of the pump is as follows: When one chamber is full, or nearly so, as shown in the chamber 12 in the drawings, the float 34 in the full chamber will be raised and the adjacent slide-block 25 lowered, so that the air-pipe 28 will be closed. The air-pressure is then applied, and air will flow into the top of the full chamber 12, as indicated by the arrow in Fig. 1, the lower position of the slide-block causing the walking-beam 22 to be tilted, so as to move the valve 20 and close the air-inlet to the chamber 11. As the pressure of air in the upper portion of the chamber 12 increases, the water will be forced out through the valve 14^a and outlet-pipe 16, as indicated by the arrow in the drawing. It will be seen that when the slide-block 25 of the

chamber 12 is lowered, as described, the walking-beam 22, being tilted, will lift the slide-block 25 of the chamber 11 and raise the plate 27, so as to permit the air to escape freely from the said chamber 11 through the pipe 28 and opening 29 of the plate. It will thus be seen that while the water is being expelled from the chamber 12 the water will be filling the chamber 11, and as this chamber becomes full the upward movement of its float 34 will release the slide-block 25 of the chamber 11, and the descent of the float 34 in the chamber 12 will open the air-pipe of said chamber and permit the action above described to be repeated, and the chambers 11 and 12 will thus be alternately filled and emptied and a constant stream of water will be forced outward through the pipe 16.

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

1. A pump comprising chambers having valved inlets and outlets at their lower ends and an air-pipe having branches connected with the upper ends of the chambers, of an air-inlet valve at the juncture of the two branches to divert the air into either chamber, floats pivoted within the said chambers, slide-blocks connected with the valve for operating it and in turn operated by said floats, and air exhaust-valves in the upper parts of said chambers and also connected with the slide-blocks, substantially as set forth.

2. A pump comprising similar chambers, each having a valve-controlled inlet-pipe at its lower end and each having a common valve-controlled outlet, a pipe having two branches connecting it with the upper ends of the chambers and said pipe connecting, also, with an air-pump, a valve arranged in the air-pipe at the juncture of its two branches and adapted to divert the water to either

chamber, a walking-beam connected with the crank of the valve, slide-blocks held to move vertically in the walls of the chambers, connections between the slide-blocks and the ends of the walking-beam, and floats suspended in the chambers and adapted to operate the slide-blocks, substantially as described.

3. The combination, with the two chambers having suitable water inlets and outlets, as described, and having air-pipes opening from their upper portions, of a pipe connecting the upper ends of the chambers and connected, also, with an air-pump, a valve mounted in the air-pipe and adapted to divert the air to either chamber, slide-blocks held to move vertically in the chamber-walls, said slide-blocks being connected by rods with opposite ends of a walking-beam secured to the air-valve, plates connected with the slide-blocks and extending through the air-outlet pipes, said plates having suitable openings therein, and floats suspended in the chambers and adapted to operate the slide-blocks, substantially as described.

4. The combination, with the chambers having suitable water inlets and outlets and having air inlets and outlets at their upper ends, an air-pipe having two branches leading to said inlets, and a pivoted valve at the juncture of said branches, of the slide-blocks held to move vertically in the walls of the chambers and having operative connection with valves controlling the air-outlets and with the single pivoted air-inlet valve, and levers pivoted within the chambers and having at their inner ends toes to strike the flanges on the slide-blocks and at their outer ends floats, substantially as described.

MELCHI M. GROVE.

Witnesses:

MATTHEW D. KARR,
N. R. STEWARD.