No. 773,209. PATENTED OCT. 25, 1904.

J. L. LATTA & J. A. MARTIN.

VALVE.

APPLICATION FILED MAY 25, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

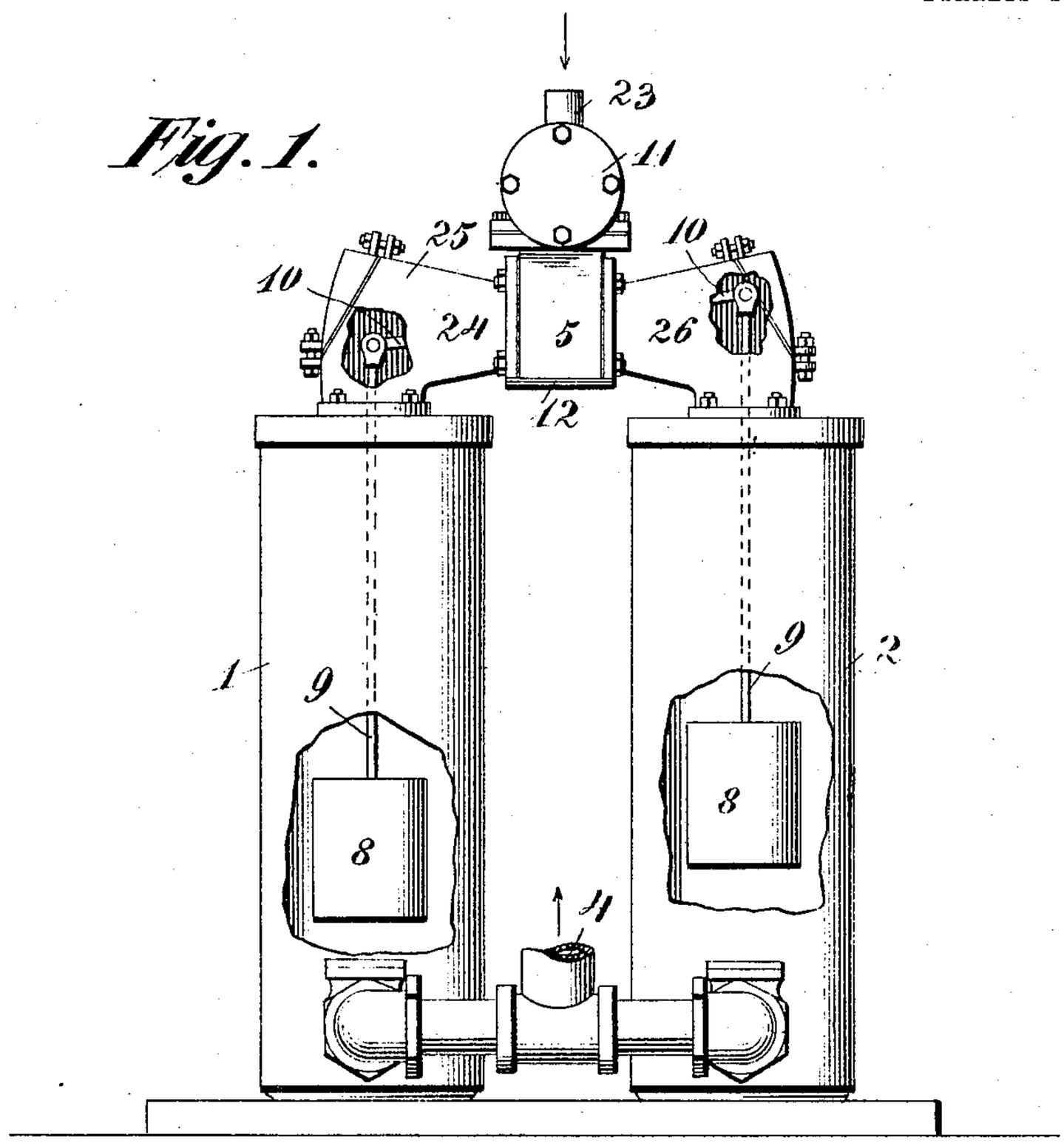


Fig. 5.

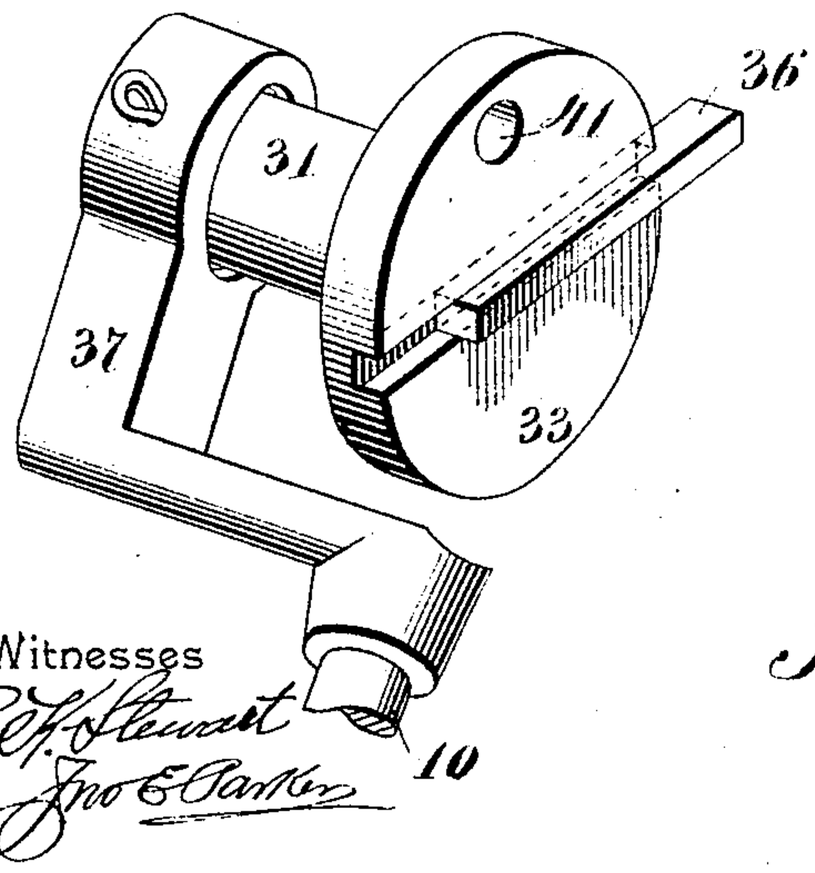
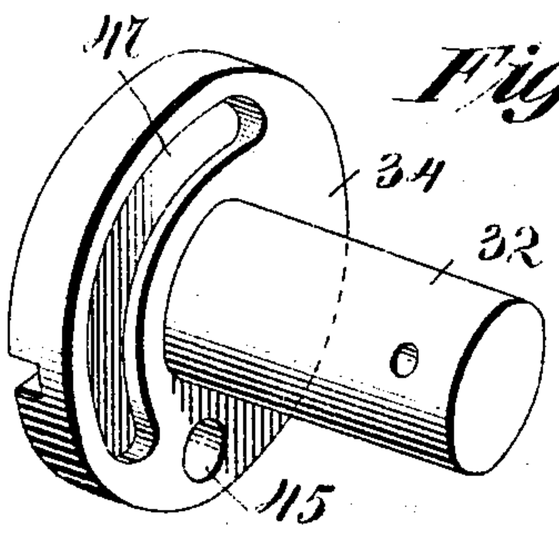


Fig. 6.



Witnesses
E. F. Stewart
Jno. E. Parker

John L. Latta
James A. Martin, Inventors
by Church & Co
Attorneys

No. 773,209. PATENTED OCT. 25, 1904.

J. L. LATTA & J. A. MARTIN.

VALVE.

APPLICATION FILED MAY 25, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

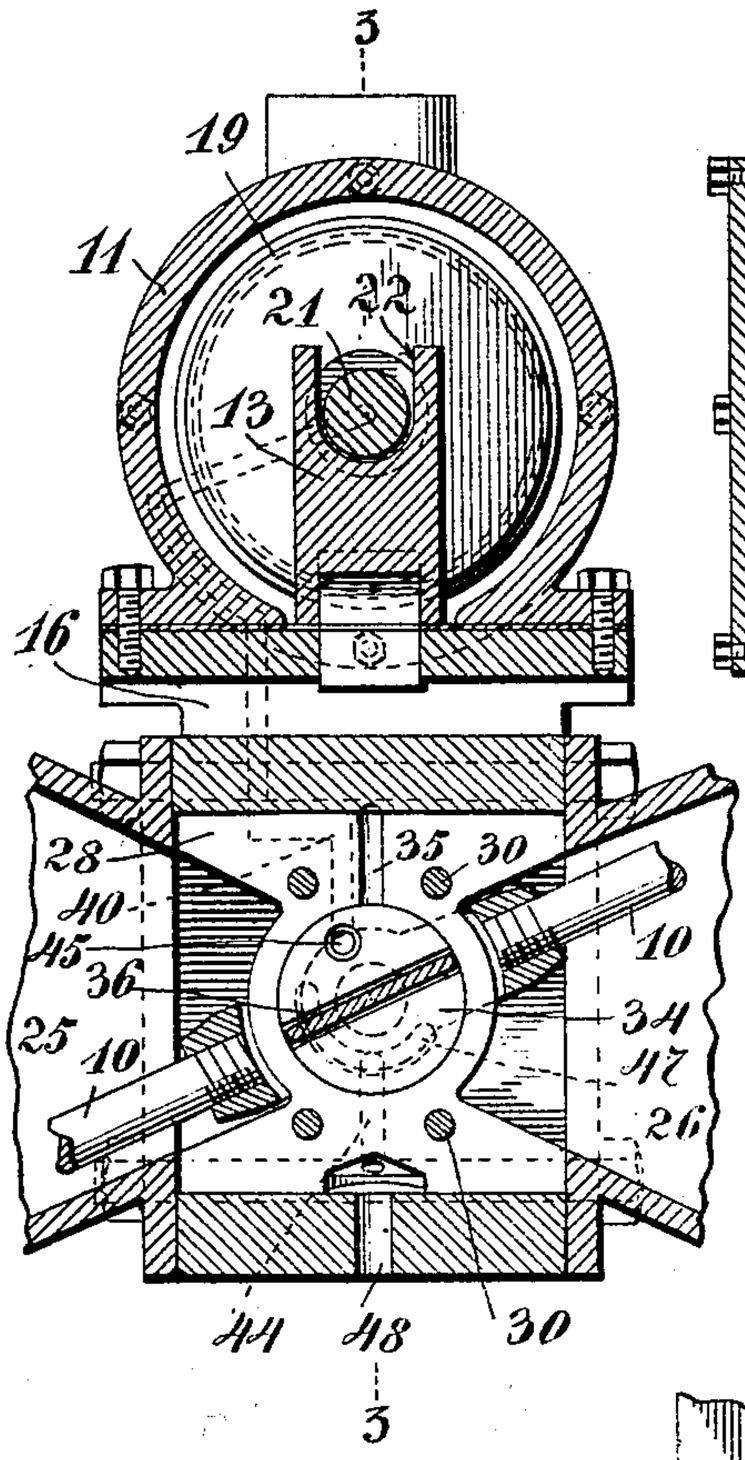


Fig. 3.

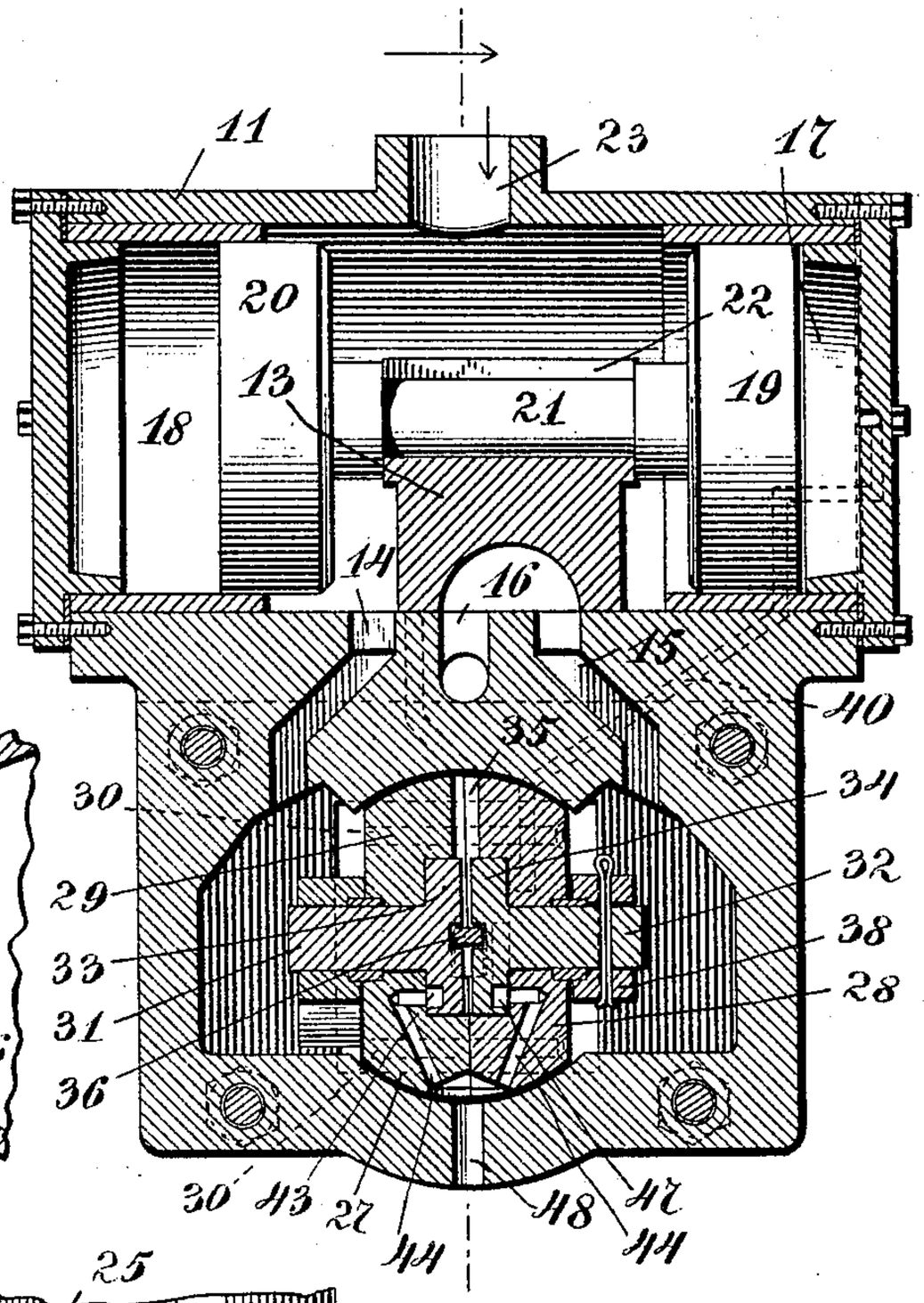
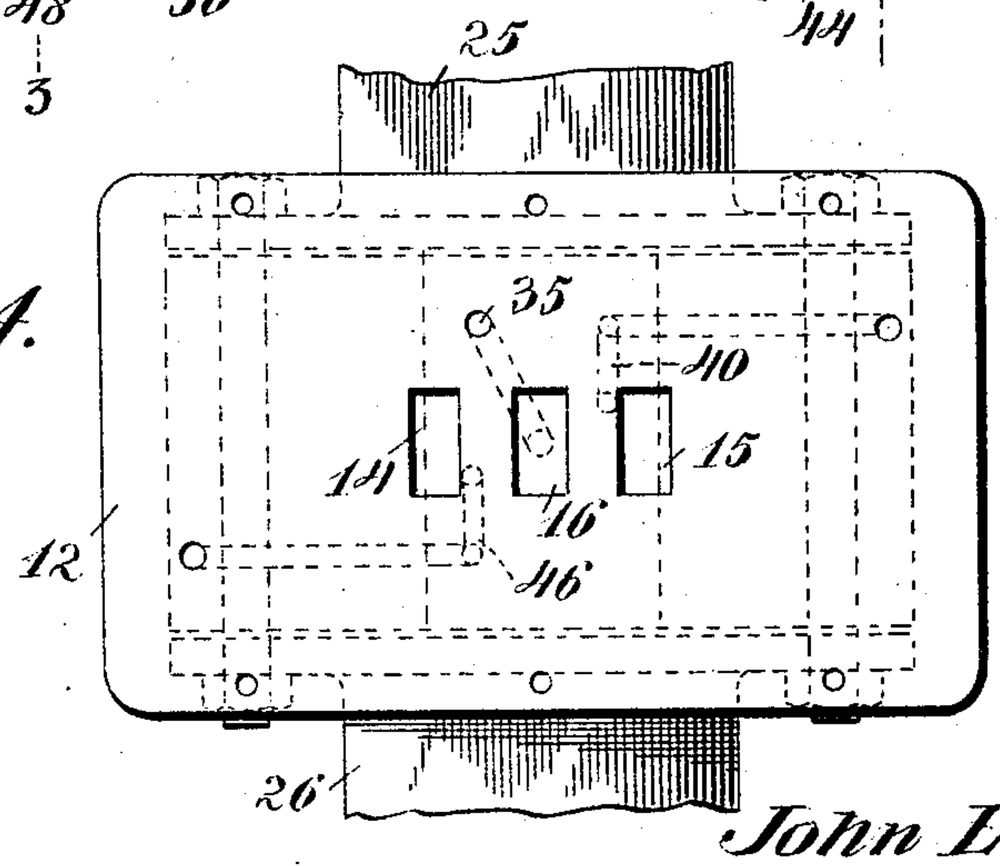


Fig. 4.



Witnesses
E. F. Stewart
Jno G Parker

John L. Latta
James A. Martin, Inventors
by Church & Co
Attorneys

No. 773,209. Patented October 25, 1904.

UNITED STATES PATENT OFFICE.

JOHN LEE LATTA AND JAMES ANDREW MARTIN, OF HICKORY, NORTH CAROLINA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 773,209, dated October 25, 1904.

Application filed May 25, 1904. Serial No. 209,793. (No model.)

To all whom it may concern:

Be it known that we, JOHN LEE LATTA and JAMES ANDREW MARTIN, citizens of the United States, residing at Hickory, in the county of Catawba and State of North Carolina, have invented a new and useful Valve, of which the following is a specification.

This invention relates to improvements in valves for compressed-air water-elevators of that general type in which air under pressure is forced alternately into a pair of cylinders or tanks for the purpose of expelling water therefrom.

The principal object of the invention is to provide a novel form of air-controlling valve of simple and economical construction and by which the flow of air will be under complete control.

A further object of the invention is to provide a device of this character in which a pair of valve members are arranged within a common casing and held to their seats by the pressure of air in a small space formed between the two members, said air-space serving also as a port or passage for the air employed in moving the main air-valve of the apparatus.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is an elevation of a compressed-air water-elevator provided with a valve constructed in accordance with the invention, portions of the casing of the device being broken away in order to more clearly illustrate the construction. Fig. 2 is a central sectional elevation of the valve and valve-casing. Fig. 3 is a transverse sectional elevation of the same on the line 3 3 of Fig. 2. Fig. 4 is a detail plan view of the main valve-seat. Figs. 5 and 6 are detail perspective views of the members of the auxiliary valve detached.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The device forming the subject of the present invention is designed more especially for use in connection with water pumping or elevating devices, wherein compressed air acts to successively or alternately displace water from a plurality of chambers.

In the drawings there is shown a compressed-air water-elevator, including a pair of chambers 1 2, each provided with a water-inlet valve opening under the influence of external pressure and closing when the air is acting to force the water from the chamber. The two chambers are connected to a common discharge-pipe 4, leading to a point of delivery. At the top of the two chambers is a valve-chamber 5, containing a suitable valve and valve-actuating mechanism, a portion of which is connected to buckets 8, arranged within each chamber and serving when the water is discharged to act through rods 9 and rocker-arms 10 to effect initial movement of the valve-operating mechanism.

The valve and its operating mechanism are arranged within a two-part casing 11 12, having suitable bolting-flanges to form fluid-proof joints. The upper surface of the section 12 is faced off to form a seat for a slide-valve 13, which controls the flow of air to the water-containing chambers 1 and 2. Leading to the valve-seat are three ports 14, 15, and 16, the port 14 being in communication with the water-chamber 1, the port 15 in communication with the water-chamber 2, and the central port 16 communicating with the open air or with a suitable pipe through which the exhaust-air is discharged. The valve 13 is of the ordinary D type and operates alternately to place the ports 14 and 15 in communication with the exhaust, one of the chambers exhausting while the other receives air under pressure from the main section 11. The upper section 11 is bored out at its opposite ends to form a pair of axial alining cylinders 17 and 18, in which are arranged pistons 19 and

20, respectively, said pistons being rigidly secured together by a stem 21, which also extends through a slot 22, formed in the upper face of valve 13. Each of the pistons is provided with an inwardly-projecting hub member for engaging against the end of the valve in order to prevent lost motion. The compressed air enters through the port 23, so that the opposing faces of the two pistons are constantly subjected to pressure, and being of equal area will not be moved in either direction under the influence of such pressure.

The lower portion of the casing is in the form of a box 24, that is bolted between the upper ends of the two water-chambers, and this box is divided transversely into two chambers 25 and 26 by the lower valve-casing 27, the valve-casing being preferably formed of brass and its ends being faced off in order that it may be connected to the water-cylinder ends and a tight joint formed, so that there will be no danger of the leakage of air from one chamber into the other. The casing 27 is made in two sections 28 and 29, that are united by bolts 30, and the opposite side walls of the casing are provided with openings for the passage of valve-stems 31 32, to which are secured disk-valves 33 and 34, respectively, these valves being slightly spaced from each other and air being introduced between them through port 35, leading directly from the main chest, so that said valves will at all times be held to their seats. The opposing faces of the two valves are grooved for the reception of a key 36, by which the valve members are connected for mutual rocking movement; but the connection is sufficiently loose to permit the valves to separate under the pressure of air entering through port 35. The stem 31 of valve 33 is secured at a point outside the valve-casing to a rocker-arm 37, that is connected to one of the arms 10, and in similar manner the stem 32 of valve 34 is connected to a rocker-arm 38, the arms being alternately raised and lowered as the device operates.

In the section 28 of the valve-casing is formed a port 40, which communicates with a similar port leading to the rear end of the cylinder 17, and in the valve member 34 is a port 45, which when the arm 38 is raised will be brought into alinement with the port 40, as indicated in Fig. 2, and air under pressure will pass from the space between the two valves through the port 45, thence through port 40 to the rear of the piston 17, and will move the piston 19 in such manner as to open port 15 to the main air-chest and establish communication between the port 14 and the escape-port 16 by way of the D-valve 13. This permits air to flow through the port 15 into chamber 5 and from thence to pass to water-chamber 2 and expel the water therefrom. During this operation the air previously admitted to the chamber 1 passes through the chamber 25 and port 14 to the escape-port 16, allowing water to enter the chamber 1, the operation continuing until sufficient water has been expelled from the chamber 2 to allow the bucket 8 to descend and gradually move the arm 38 to the lowest position. When this is done, an arcuate port 47 in the valve member 34 is moved to place the port 40 in communication with an exhaust-port 44, and air will be exhausted from the cylinder 17 through the ports 40, 44, and 48 to the outer air. At the same time upward movement of the arm 37, which is simultaneous with the downward movement of arm 38, will move port 41 of the valve 33 into alinement with a port 46, leading upward from the valve-casing to the outer end of the cylinder 18, and as the air exhausts from cylinder 17 air under pressure will enter cylinder 18 and cause movement of the valve 13 in the opposite direction, opening communication between the main air-chest and port 14. Air under pressure then passes through chamber 25 to the water-containing chamber 1 and expels the water therefrom. At the same time port 15 is placed in communication with port 16 and the air of chamber 2 passes through chamber 26, port 15, valve 13, and thence through escape-port 16. During the time water is being expelled from the chamber 1 the arm 37 descends, while arm 38 is elevated. This brings the port 43 in the valve 33 into alinement with the port 46 and the escape-port 44, leading to the main escape-port 48, so that the air previously admitted to the cylinder 18 is allowed to escape. This operation is continued so long as there is sufficient water to flow into the chambers and the air-supply is maintained.

Having thus described the invention, what is claimed is—

1. The combination with a main air-valve, of a secondary controlling-valve including a pair of members each having ports for controlling the flow of air to and from the main valve-operating devices, a ported casing containing said secondary valve, and an air-port leading to the casing at a point between the two valve members and serving to supply air between the members to hold them to their seats and to operate the main valve-actuating devices.

2. The combination with a ported casing, of a pair of ported disks arranged within the casing and connected for mutual oscillatory movement, said members being free to separate laterally and being held to their respective seats by the pressure of air introduced between them.

3. The combination with a ported valve-casing, of a valve formed of a pair of ported disks held away from each other and against their respective seats by pressure of air introduced between them, the adjacent faces of said members being slotted, and a locking-key entering the slots and connecting the members

to each other for mutual oscillatory movement.

4. The combination with a ported valve-casing, of a pair of disks forming independent valve members and maintained in spaced relation by fluid-pressure, means for connecting the disks for mutual oscillatory movement, and means for oscillating said disks.

5. The combination with a ported valve-casing, of a pair of ported disks, an air-port leading into the valve-casing and serving for the admittance of air thereby to maintain the disks in spaced relation, a key connecting the disks for mutual oscillatory movement, and means for oscillating said disks.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

JOHN LEE LATTA.
JAMES ANDREW MARTIN.

Witnesses:
W. N. MARTIN,
C. M. SHERRILL.