No. 832,394. PATENTED OCT. 2, 1906.

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

VALVE.

APPLICATION FILED AUG. 5, 1905.

2 SHEETS—SHEET 1.

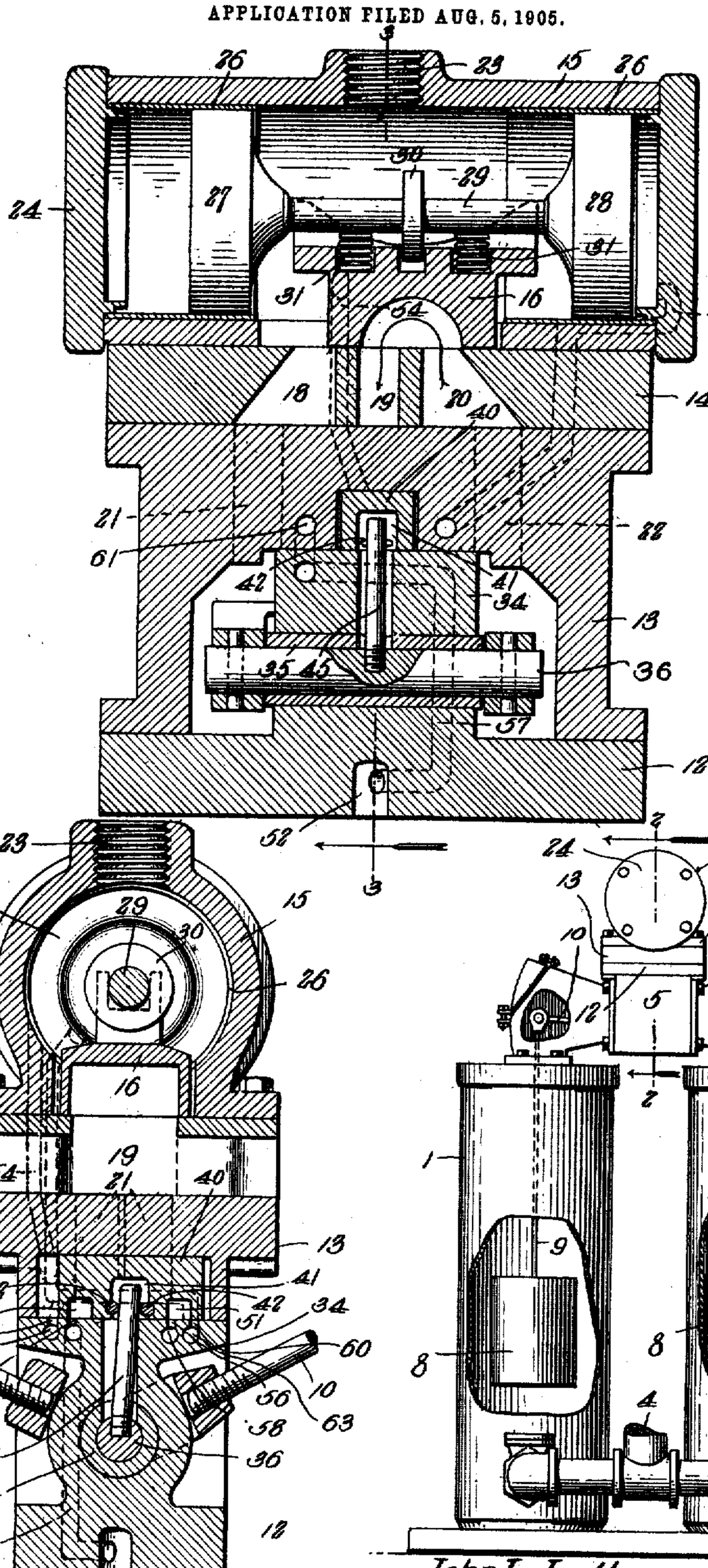


Fig. 2.

Fig. 3.

Fig. 1.

Witnesses

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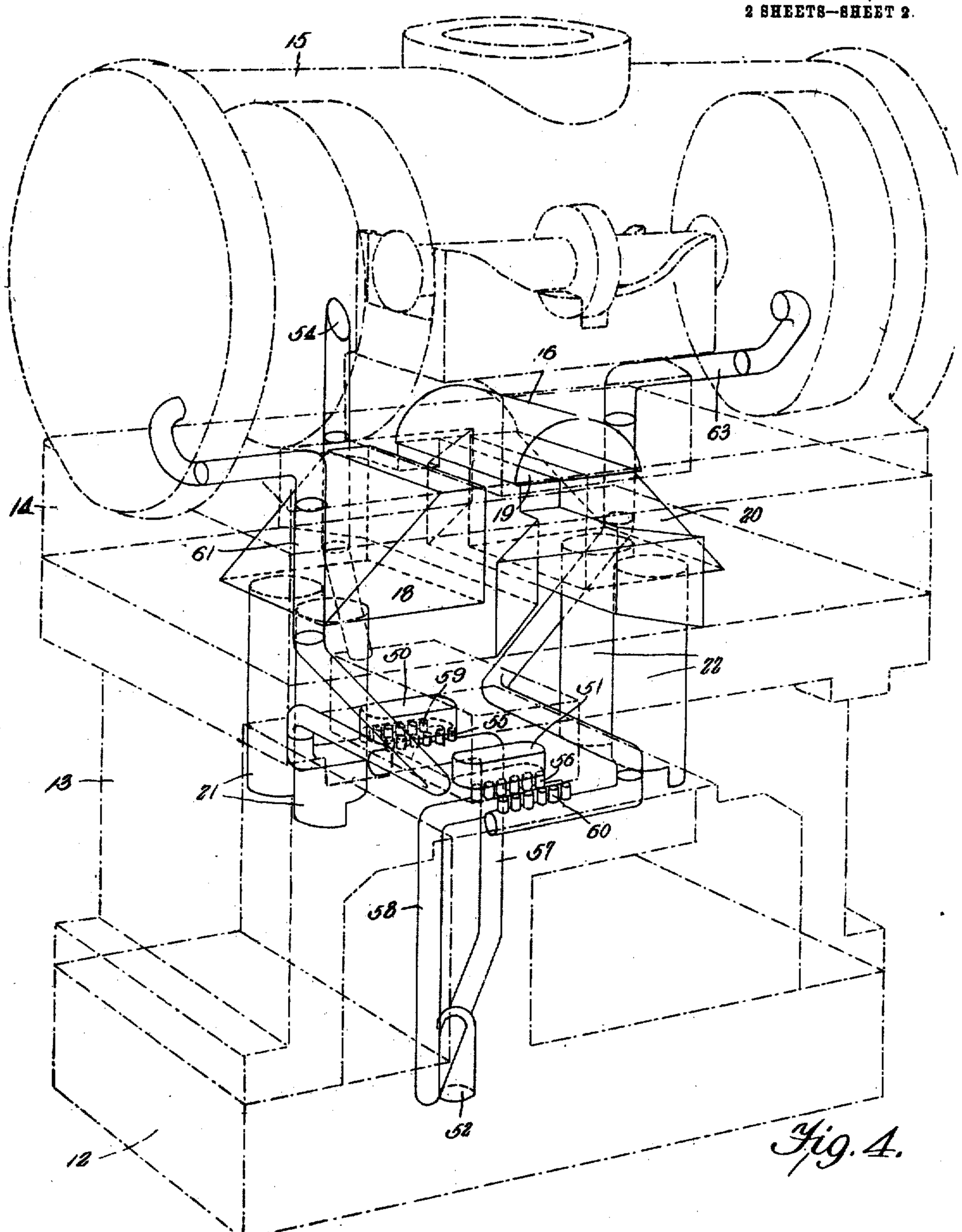


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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

## VALVE.

No. 832,394. Specification of Letters Patent. Patented Oct. 2, 1906.

Application filed August 5, 1905. Serial No. 272,921.

*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 auxiliary-valve mechanism for controlling the position of the main valve, and, further, to provide a mechanism of compact and simple construction in which the several ports or passages may be formed at comparatively small expense.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of 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 being broken away in order to more clearly illustrate the construction and general arrangement of the elevator. Fig. 2 is a vertical section through the valve-chamber on the line 2 2 of Fig. 1, the view being on an enlarged scale. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2. Fig. 4 is a perspective diagram showing the arrangement of the various ports.

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 where compressed air is employed to alternately displace the water from a pair of cylinders or tanks.

In the drawings there is shown a compressed-air water-elevator, including a pair of chambers 1 and 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. Both 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 a bucket or weight 8, arranged one 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 suitable casing, including a number of superposed sections 12, 13, and 14 and a cylinder 15, all of these being rigidly bolted together in order to form liquid-proof joints. The upper face of the section 14 is faced off to form a seat for a slide-valve 16, which controls the flow of air to the water-containing chambers 1 and 2. Leading to the valve-seat are three ports 18, 19, and 20, the port 18 communicating, through suitable passages 21, with the chamber 1, while the port 20 communicates, through passages 22, with the chamber 2. The port 19 is an exhaust-port and is in free communication with the atmosphere.

The slide-valve 16 is movable on its seat to alternately place the ports 18 and 20 in communication with the interior of the cylinder 15, to which compressed air is supplied through a suitable port 23, and while one of the ports is thus utilized to permit the passage of air under pressure from the cylinder to one of the chambers the opposite port is placed in communication with the exhaust in order to allow the air from the second chamber to readily escape as water enters said second chamber. The opposite ends of the cylinder are provided with suitable heads 24 25, and near the ends of the cylinder are suitable bushings 26 for the reception of a pair of pistons 27 28, connected for mutual movement by a rod 29. The central portion of the rod

29 has a flange 30, that fits within a suitable recess formed in the top of the slide-valve 16, and said valve is held to its seat by means of springs 31, arranged between the upper portion of the valve and the rod 29.

The lower casing 12 is provided with a centrally-disposed vertically-extending block 34, in the lower portion of which is a bushing 35, arranged for the reception of a rock-shaft 36, and to the opposite ends of the rock-shaft are secured the bucket-actuated rocker-arms 10. The top of this block is faced to form a seat for an auxiliary slide-valve 40, having a centrally-disposed recess 41, across which extends a pair of spaced rollers 42, that preferably are formed of tool-steel or other metal which will resist wear. Projecting into the recess 41 is a valve-actuating pin 45, the lower end of which is rigidly secured to the shaft 36, and each time the latter is rocked by the downward movement of one of the buckets and upward movement of the other bucket the movement will be transmitted by the arm 45 to the valve, and the latter will be shifted for the purpose of controlling the flow of a volume of compressed air or other fluid to one or other end of the cylinder 15—that is to say, between the pistons and heads of said cylinder with a view of shifting the position of the valve 16. The lower face of the valve 40 is provided with two ports 50 and 51, which control the flow of fluid from the interior of the chamber in which the valve is seated to the opposite ends of the cylinder 15 and between said cylinder 15 and an exhaust-port 52.

In tracing the positions of the ports reference is had to Fig. 4, wherein the ports and passages are shown in diagrammatic form. Leading from the central portion of the cylinder 15, and therefore in constant communication with the compressed-air supply, is a port 54, which communicates with the interior of the valve-chamber, so that the latter receives a constant supply of compressed air. In the valve-seat are formed a number of vertically-disposed ports 55 56, which communicate, respectively, through the passages 57 and 58 with the mainexhaust 52. The valve-seat is also provided with two sets of ports 59 60, that are arranged parallel with the ports 55 and 56, previously referred to. The several ports 59 communicate through a passage 61 with the inner face of the cylinder-head 24, so that if said ports 59 are uncovered air will flow from the main cylinder 15 through the passage 54 to the auxiliary-valve chamber, thence through ports 59, the passage 61, and act on the piston 27, or if the auxiliary valve is adjusted to the opposite position, or the position shown in Fig. 4, air will pass through the ports 60 and the port 63 to the cylinder-head 25 and will act on the piston. When either set of ports 59 and 60 is opened, the other set is placed in communication with the exhaust, as will be seen on reference to Fig. 4, and in this case air flows from cylinder-head 24 through the port or passage 61 to ports 55, thence up through the valved port or recess 50, down through ports 55 to passage 57, and thence to the exhaust 52. It will be noted that the outer casing 13 forms a housing for the upper portion of the lower section 12 and also forms the upper wall of the valve-chamber, so that if these parts are disconnected the valve may be readily removed for cleaning or repairs.

Having thus described the invention, what is claimed is—

1. In apparatus of the class described, a sectional ported casing, the upper face of the lower section being faced to form a valve-seat, and the opposite sides of said lower section being in communication with the water-chambers, ports 21, 22 leading from the valve seat to the opposite sides of the lower section, a slide-valve mounted on the seat and controlling the ports, a double cylinder formed in the upper section, a pair of pistons mounted in the cylinder, a rod connecting said pistons, said rod being connected to the valve, a rock-shaft in the lower portion of the lower section, float or weight controlled arms secured to said shaft, a slide-valve operated from the rock-shaft, and ports arranged under the control of the slide-valve and serving for the admission and exhaust of air to the outer ends of said double cylinder.

2. In apparatus of the class described, a casing comprising a lower section having a centrally-disposed vertically-extended portion, the upper face of which is faced to form a valve-seat, a detachable section forming a partial housing for the lower section and recessed to form a valve-receiving chamber, an air-port leading to the chamber, a pair of sets of ports opening at opposite ends of the valve-seat, a slide-valve mounted on the seat and provided with recesses or ports near its opposite ends, said valve being further provided with a central recess, wear-pins on the side walls of said central recess, a rock-shaft carried by the lower section, means for operating the rock-shaft, and an arm extending from the rock-shaft and engaging said wear-pins.

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:
C. M. SHERRILL,
A. A. WHITENER.