

No. 695,632.

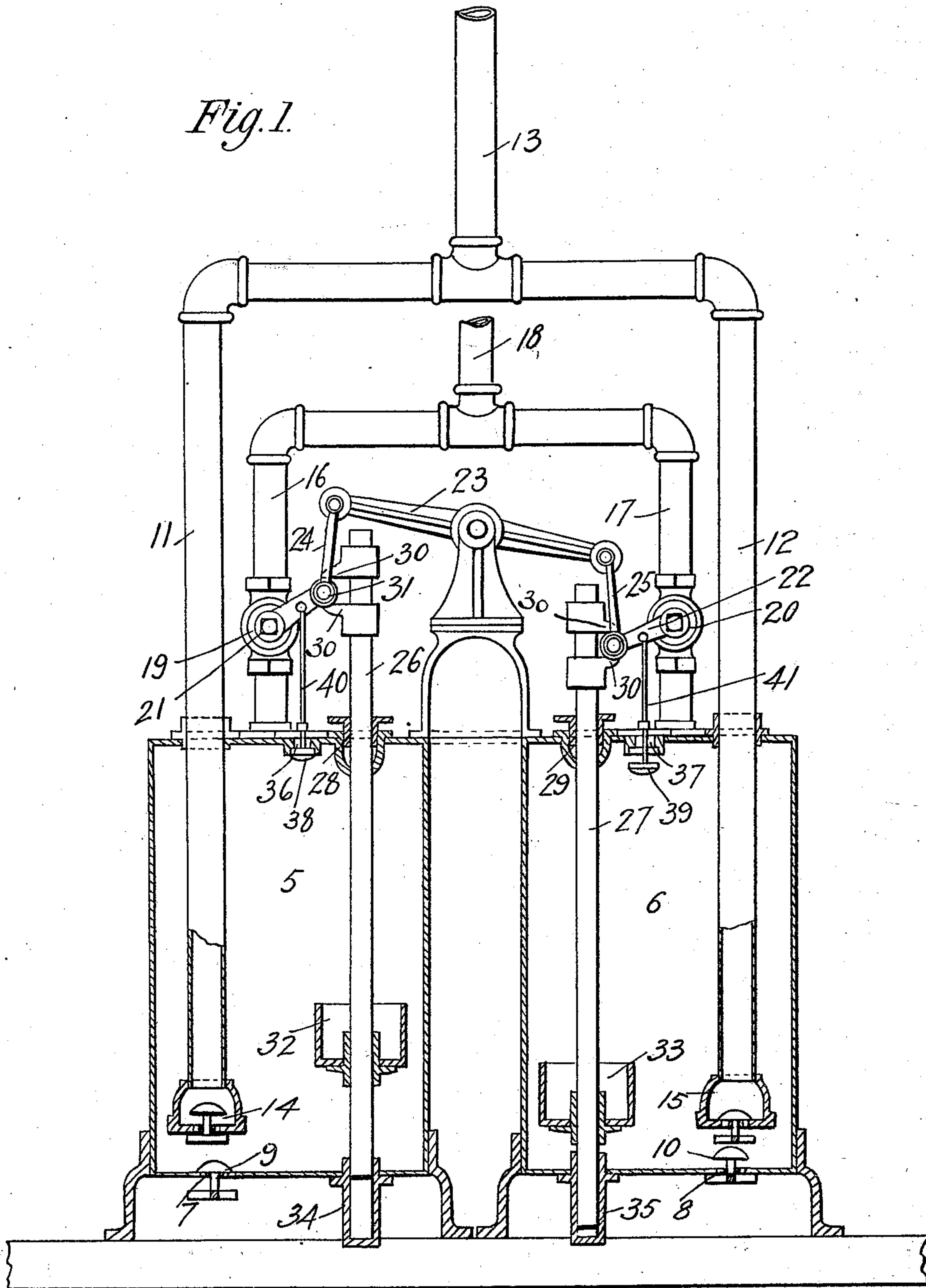
Patented Mar. 18, 1902.

G. D. BUCHANAN.
COMPRESSED AIR WATER ELEVATOR.

(Application filed May 1, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
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2 Sheets—Sheet 2.

Fig. 2.

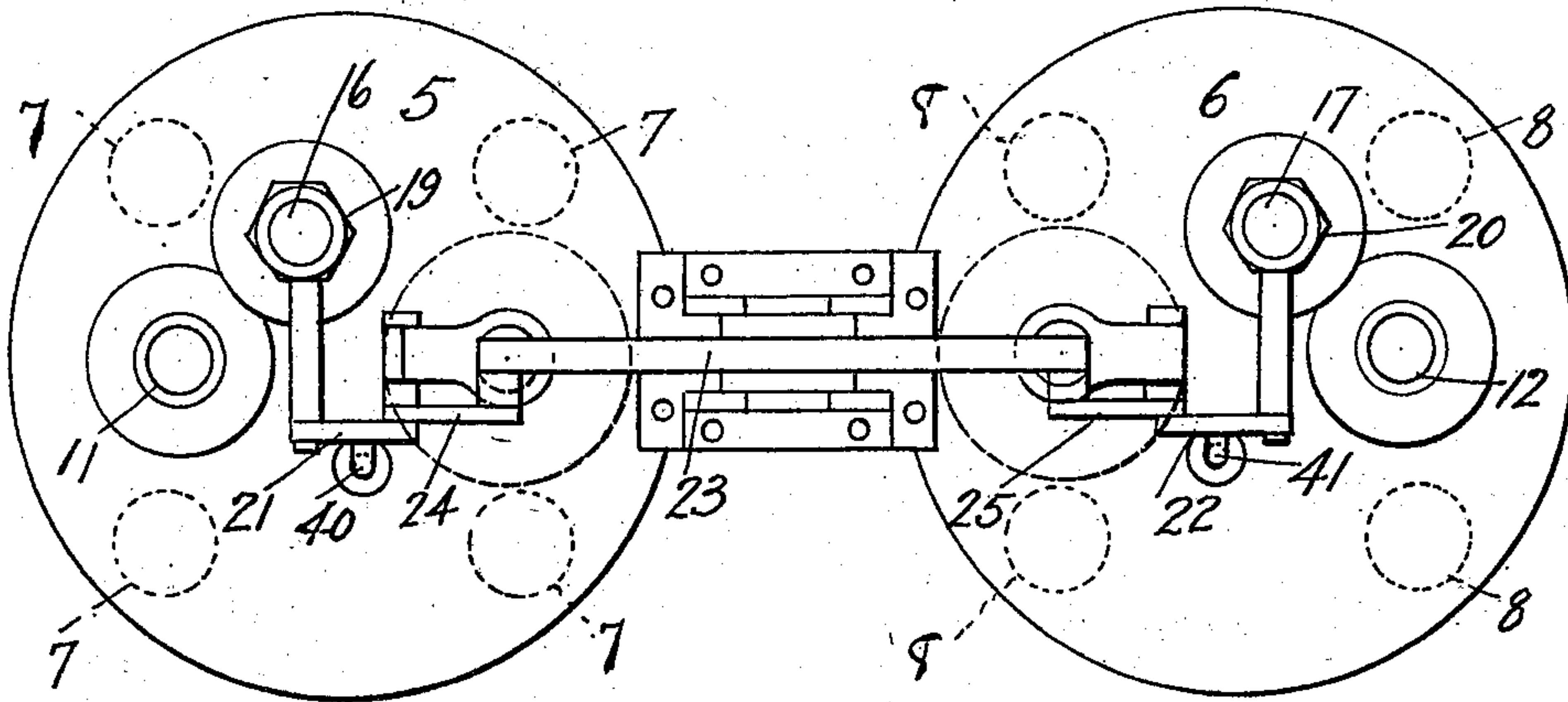
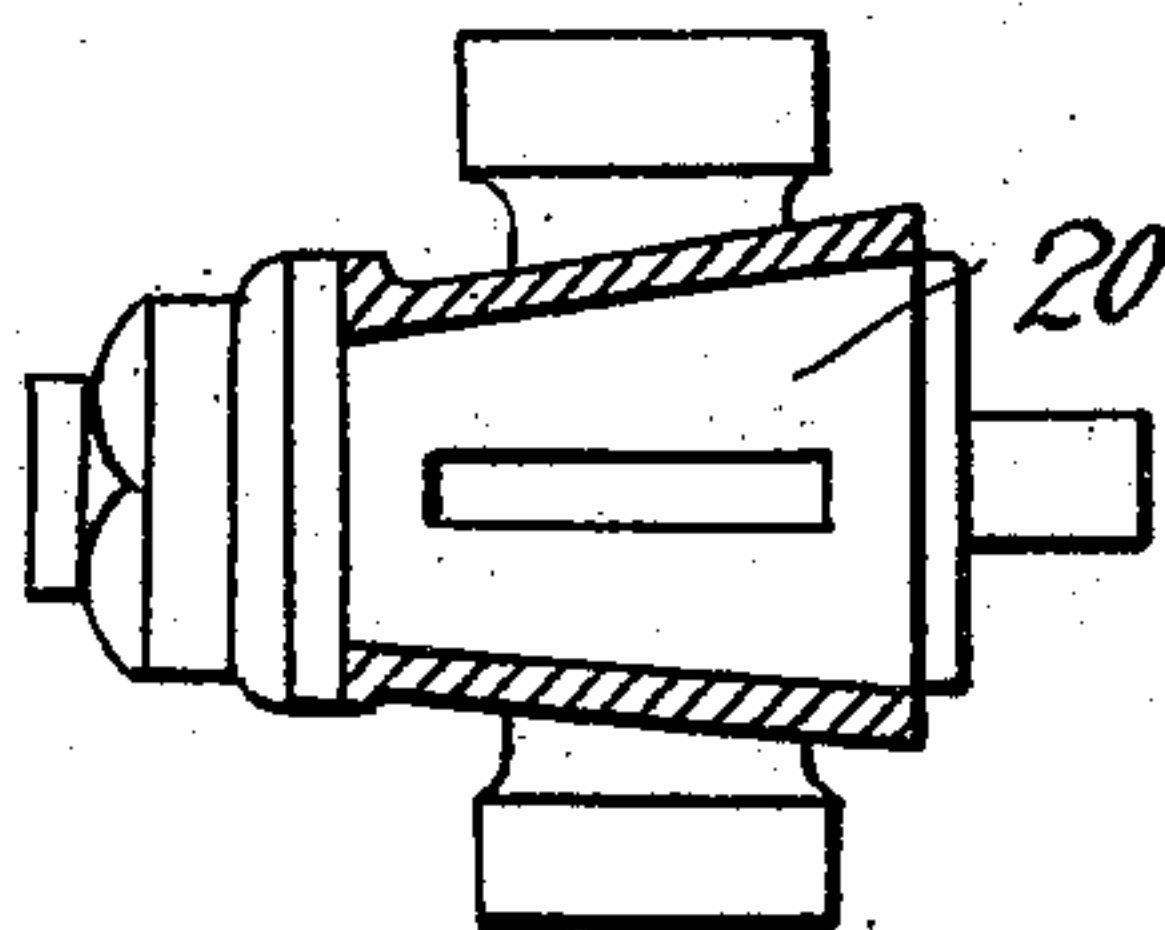


Fig. 3



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UNITED STATES PATENT OFFICE.

GREENLEE DAVIDSON BUCHANAN, OF JACKSONVILLE, FLORIDA.

COMPRESSED-AIR WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 695,632, dated March 18, 1902.

Application filed May 1, 1901. Serial No. 58,362. (No model.)

To all whom it may concern:

Be it known that I, GREENLEE DAVIDSON BUCHANAN, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Compressed-Air Water-Elevator, of which the following is a specification.

This invention relates to water-elevators in general, and more particularly to that class operated by compressed air; and it has for its object to provide a device of this nature wherein by supplying a constant flow of air under pressure thereto the water-chambers will be successively and alternately filled and emptied, the shifting of the valves being automatic.

Further objects and advantages of the invention will be understood from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a view, partly in elevation and partly in vertical section, and showing the complete mechanism. Fig. 2 is a top plan view of the apparatus. Fig. 3 is a detail view, partly in section and partly in elevation, and showing one of the cut-off valves for regulating the supply of air to the water-chambers.

Referring now to the drawings, the present apparatus consists of two water-chambers 5 and 6, which are disposed side by side and which are provided with inlet-openings 7 and 8, respectively, provided with upwardly-opening valves 9 and 10. Leading from the chambers 5 and 6 are the outlet-pipes 11 and 12, which are passed through the tops of the chambers and reach points near to the bottoms thereof, these pipes above the chambers being connected to a common discharge-pipe 13, and at the lower ends of the pipes 11 and 12 are check-valves 14 and 15, which open outwardly of the chambers, so that water may pass out through the pipes, but will be prevented from ingress therethrough. With this arrangement it will be understood that if the chambers be placed or submerged in a body of water and air-vents be provided for them water will enter the chambers through the valved inlet-openings, and if air be then forced into either of the chambers the water

therein will be forced outwardly through its outlet-pipe. In practice air is supplied to the two chambers interchangeably through the branches 16 and 17 of an air-supply pipe 18, which receives from a suitable source, and the branches are provided with plug-valves 19 and 20, having cranks 21 and 22 for rotating or oscillating them to open and close the branches.

To operate the plug-valves automatically and at the proper times, a walking-beam or rocker 23 is pivoted midway of its ends at a point above and between the chambers 5 and 6, and the ends of this rocker are connected with the cranks 21 and 22 by means of the links 24 and 25, so that the cranks will be moved simultaneously, but in opposite directions, so that as one of the valves is opened the other will be closed. In order that each valve may be opened when the water in its corresponding chamber has reached a predetermined height and may be closed when the water has been exhausted, shift-rods 26 and 27 are provided and are passed through stuffing-boxes 28 and 29 in the upper ends of the chambers, and at the upper end of each of the rods are laterally-disposed tappets 30, between which is received a friction-roller 31 on the pivot connecting the adjacent valve-crank with its link, so that as a shift-rod is reciprocated its connected crank will be moved to operate the corresponding valve. Each of the shift-rods is provided near its lower end with a water-holding cup 32 and 33, respectively, to form weights, and the extreme lower ends of the rods are slidably engaged with guide-sockets 34 and 35 in the bottoms of the chambers.

The chambers are provided with air-vent openings 36 and 37, provided with valves 38 and 39, which open inwardly of the chambers, and these valves are connected, by means of rods 40 and 41, with the cranks 21 and 22, respectively, so that as the cranks are moved upwardly the valves will close the vents, and when the cranks are moved downwardly the valves will open the vents, it being understood that upward movement of the valve-cranks opens the valves of the air-pipes to permit ingress of air.

The operation of the apparatus is as follows: The cylinders or chambers being im-

mersed and the parts being in the positions shown, the chamber 5 is full of water, the air-vent is closed, and the air-inlet is open, while the inlet-valve of chamber 6 is open, as is also the air-vent, while the air-inlet is closed. Air under pressure then enters the chamber 5 and pressing upon the water therein forces it upwardly through the outlet-pipe while water is running into the chamber 6, the cups 32 and 33 being filled with water to act as weights. As the water is forced from chamber 5 and water enters chamber 6 the cup 32 drops and cup 33 rises, so that the valve 19 is closed, and valve 20 is finally opened, at which time, however, chamber 5 has been practically emptied and chamber 6 has filled. At the same time the air-vent of chamber 5 is opened and air-vent of chamber 6 is closed. Air then enters chamber 6 while water enters chamber 5, and the chamber 6 is exhausted while chamber 5 is filled. This shifting of the valves is automatic, and thus so long as air under proper pressure is supplied water will be forced through the outlet-pipes of the apparatus.

It will be understood that in practice modifications of the specific construction shown may be made and that any suitable materials and proportions may be used for the various parts without departing from the spirit of the invention.

What is claimed is—

1. A device of the character specified, comprising two separate water-chambers, each having a valved water-inlet at its bottom and a valved air-vent at its top, an air-supply pipe connected with each of the chambers, a rotary valve carried by each of the said pipes

and provided each with a crank-arm, a walking-beam, a link carried by each of the ends of the walking-beam and connected to the said crank-arms, a rod connecting with each crank and with the air-vent valve, a shift-rod in each of the chambers, a water-holding cup carried by each of the shift-rods, a connection between each shift-rod and the cranks of the rotary valve, and valved discharge-pipes having their lower ends disposed adjacent to the lower ends of the said chamber.

2. A device of the character specified, comprising two separate water-chambers, each having a valved water-inlet at its bottom and a valved air-vent at its top, an air-supply pipe connected with each of the chambers, a rotary valve carried by each of the said pipes and provided each with a crank-arm provided at its extremity with a friction-roller, a walking-beam, a link carried by each of the ends of the walking-beam and connected with the outer ends of the crank-arms, a rod connected with each crank-arm intermediate of its ends and with the air-vent valve, a cup-bearing shift-rod in each of the chambers, pairs of tappets carried by each shift-rod and engaging the friction-rollers of the crank-arms, and discharge-pipes having their lower ends provided with upward-opening valves, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GREENLEE DAVIDSON BUCHANAN.

Witnesses:

H. H. SIMMONS,
A. S. HARGRAVES.