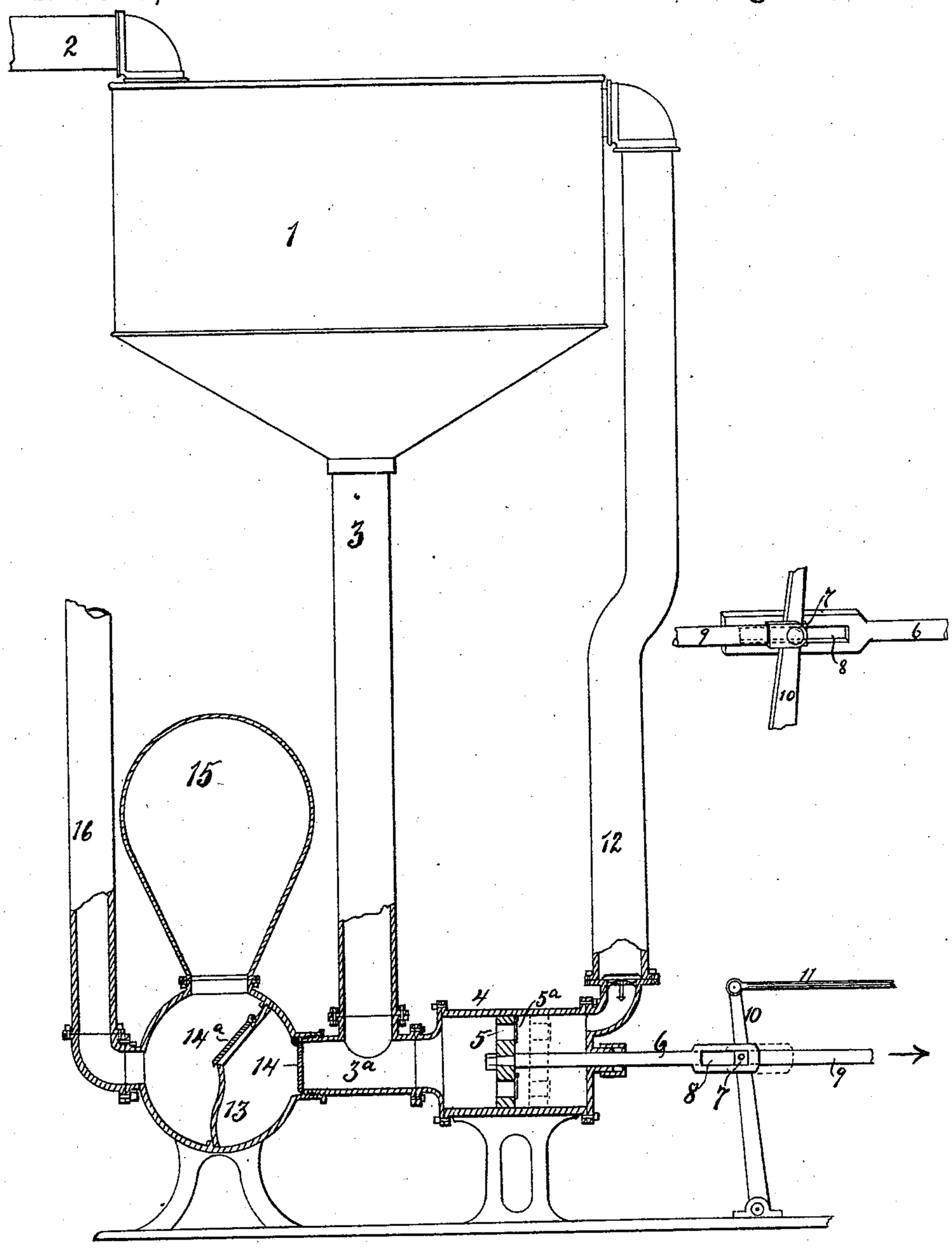
(No Model.)

J. M. ALLEN & A. J. WELCKER.

MOMENTUM WATER ELEVATOR.

No. 525,305. Patented Aug. 28, 1894.



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UNITED STATES PATENT OFFICE.

JAMES M. ALLEN AND ARMAND J. WELCKER, OF ST. LOUIS, MISSOURI.

MOMENTUM WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 525,305, dated August 28, 1894.

Application filed August 22, 1893. Serial No. 483,772. (No model.)

To all whom it may concern:

Be it known that we, JAMES M. ALLEN and ARMAND J. WELCKER, both of the city of St. Louis, in the State of Missouri, have invented a certain new and Improved Momentum Water-Elevator, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

The object of this invention is to set up increased momentum in a descending column of water by an exhaust produced by a positive power from a suitable motor, and to cause the said momentum to be expended in the elevation of a smaller body of water, to a greater height, as hereinafter described.

The accompanying drawing is an elevation, partly in section, of an apparatus embodying our invention.

1 represents an elevated tank, supplied by a constant inflow, as at 2.

3 is a descending pipe, communicating at bottom by a pipe 3^a, with a pump cylinder 4, in which works a piston 5, the piston rod 6 of which has a lost motion connection by means of a slide 7, and slot 8, with a rod 9, operated by a steam engine piston or other suitable motor. As the character of this prime motor is unimportant, none is shown.

The slide 7 connects by its supporting lever arm 10, with a rod 11, to control the reciprocating movement of the prime motor, as for example through an ordinary slide valve.

The pump piston 5 has ports guarded by check valves 5^a, for the purpose of allowing the free passage of water therethrough in the return stroke of the piston.

The delivery end of the pump cylinder 4 communicates with a port or discharge pipe 12, which may be a waste pipe, if the supply of water be abundant, or if a motor rod 9 of sufficient power be used, may be carried up, as in the present illustration, so as to return the water from the pump cylinder to the tank 1. The effective discharge of water is through a valve chamber 13, provided with check valves 14, 14^a to prevent backward flow, communicating at top with an air chamber 15, forming a cushion to equalize the flow, and with a discharge pipe 16, which is carried to any height to which water is to be raised.

The operation of the apparatus is as follows: The pump piston being moved by the motor rod 9, in the direction indicated by the arrow, will exhaust water from the lower end of the descending pipe 3, thus setting up an increased momentum in the water descending through the pipe 3, and forcing the water which is in front of the pump piston 5 up the pipe 12. When the pump piston 5 reaches the termination of its effective stroke, the check valves 5^a therein will be prevented from opening by contact with the cylinder head, and hence the motion of the water behind the piston is suddenly arrested in this direction, causing the momentum to be exerted in forcing water through the valve chamber 13, and discharge pipe 16. The lost motion of the motor rod 9, afforded by the slot 8 in which the slide 7, carried by said motor rod, works, affords time for the operation of this momentum force in driving water up the delivery pipe 16. The continued backward movement of the motor rod 9, after the slide 7 reaches the end of the slot 8, carries the pump piston 5 back to the receiving end of the cylinder 4, the check valves 5^a opening freely to permit the passage of water through the piston. The effective stroke is then repeated by the forward movement of the motor rod 9 in the direction of the arrow, and thus the operation proceeds continuously. The lost motion between the motor rod and the pump piston is illustrated in dotted lines, and by a detail view, showing the opposite side.

We claim as our invention—

In a momentum water elevator, the combination of the water supply, the descending pipe 3 leading from the water supply, the chamber 13 provided with a valve 14 and delivery pipe 16, the pipe 3^a connecting the descending pipe 3 with the chamber 13, the pump 4 5 provided with the pump piston 6, connected to the chamber 13 and descending pipe 3, a motor-rod 9 for actuating the pump, connected with the pump piston 6, by a slide and slot connection 7 8, to permit lost motion between the motor and the pump piston, causing a rest in the pump piston during the momentum stroke of the ram, as explained.

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In presence of—
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