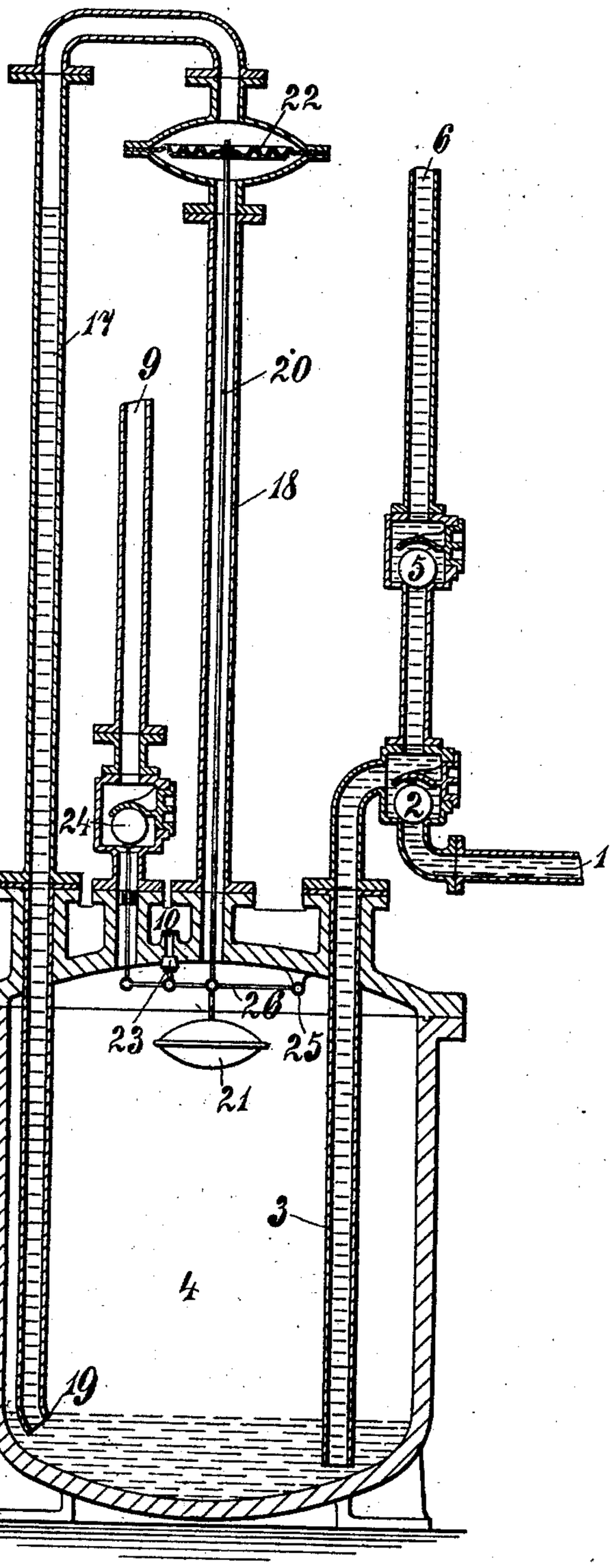
No. 716,941. Patented Dec. 30, 1902.

A. SCHOLL.

APPARATUS FOR RAISING LIQUIDS.

(Application filed Sept. 3, 1901.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

ALBERT SCHOLL, OF MANNHEIM, GERMANY.

APPARATUS FOR RAISING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 716,941, dated December 30, 1902.

Application filed September 3, 1901. Serial No. 74,170. (No model.)

To all whom it may concern:

Be it known that I, ALBERT SCHOLL, a subject of the Grand Duke of Baden, residing at Mannheim, Germany, have invented certain new and useful Improvements in Apparatus for Raising Liquids, of which the following is a specification.

The present invention relates to an apparatus for raising liquids, particularly acids and caustic liquids, by means of compressed gas, compressed air, or steam.

The annexed drawing is a vertical cross-section through the apparatus.

The apparatus works automatically. The liquid to be raised passes through pipe 1, valve 2, and pipe 3 into the vessel 4, which is closed on all sides, and the liquid is forced out through pipe 3, valve 5, and pipe 6. 1 is therefore the supply-pipe, 6 the outlet or ascending pipe, 2 the supply-valve, and 5 the pressure-valve. The pipe 3 reaches nearly to the bottom of the vessel 4. The latter is connected by the pipe 9 either with a steam-boiler or with a vessel containing compressed gas or air. For the sake of simplicity compressed air will be referred to in the present description, the effect being the same in either case. A stand-pipe 17 extends into the vessel 4 nearly to the bottom, as at 19, and is connected at its upper end to a pipe 18 in communication with the vessel, and in an enlargement of which is placed a membrane 22, connected by a rod 20 to a float 21 within the vessel. This float is suspended from a rod 26, pivoted at 25, and connected at its other extremity with a valve 23, adapted to close an exhaust-opening 10, and also with a valve 24 in the compressed-air-inlet pipe 9, so that it simultaneously controls and operates both said valves. The membrane 22 is adapted to keep the float 21 in its raised position until the liquid in the vessel 4 has fallen below the end 19 of the stand-pipe 17, as hereinafter explained.

The action of the apparatus is as follows: The liquid to be raised enters the vessel 4 through the pipe 1, valve 2, and pipe 3 while the float is in its lowest position. For permitting the air contained in vessel 4 to escape the exhaust-valve 23 is open; but the compressed-air valve 24 is closed. When the vessel 4 is filled with liquid, the float 21 rises and reaches the upper position illustrated, in which it closes the exhaust-valve 23 and opens the valve 24 by means of the aforesaid lever 26. The compressed air now entering the vessel 4 through the pipe 9 forces the liquid to be raised through the pipe 3 and the valve 5 into the pipe 6. At the same time part of the said liquid is forced into the stand-pipe 17, and thus forms a liquid column, which reduces the specific pressure above the membrane 22 to an extent corresponding to the specific weight of the said column and its elevation above the liquid-level in the vessel 4, while beneath the membrane the full pressure continues to act through the pipe 18. The result of this is that the membrane 22 and the float 21, connected therewith by means of the rod 20, remain in the upper position until the liquid column descends. When toward the end of the period of pressure the level of the liquid falls below the end of the stand-pipe 17, the column of liquid in the latter immediately descends, whereupon the equilibrium of pressure is restored on both sides of the membrane, so that the rod 20 can descend under the weight of the float 21 and moves the lever 26, thus closing the compressed-air valve 24 and opening the exhaust-valve 23, whereupon the operation is repeated.

What I claim is, in apparatus for raising liquids—

1. The combination with a closed vessel having inlet and outlet for liquid, of means for supply of pressure medium thereto, a float within said vessel adapted to control the supply of pressure medium, a stand-pipe extending into said vessel to near the bottom thereof, a membrane in connection with the float and in communication with the stand-pipe from above, a second pipe in communication with the membrane and vessel from below, and an exhaust-valve controlled by said float substantially as described.

2. The combination with a closed vessel having inlet and outlet pipes for liquid and antireturn valves in said pipes, of an inlet-pipe for pressure medium passing into said vessel, a valve in said pressure-medium pipe, a float within said vessel, adapted to control said pressure-medium valve, a stand-pipe extending into said vessel to near the bottom thereof, a closed chamber in communication

with said stand-pipe, a membrane in said chamber and in connection with the said float said membrane communicating with said stand-pipe from above, and a second pipe in communication with the vessel and chamber and the membrane from below, and an exhaust-valve controlled by said float so as to be alternately opened and closed with the pressure-medium valve substantially as described.

In witness whereof I have signed this specification in the presence of two witnesses.

ALBERT SCHOLL.

Witnesses:

F. STEPHANI,

JACOB ADRIAN.