

No. 767,502.

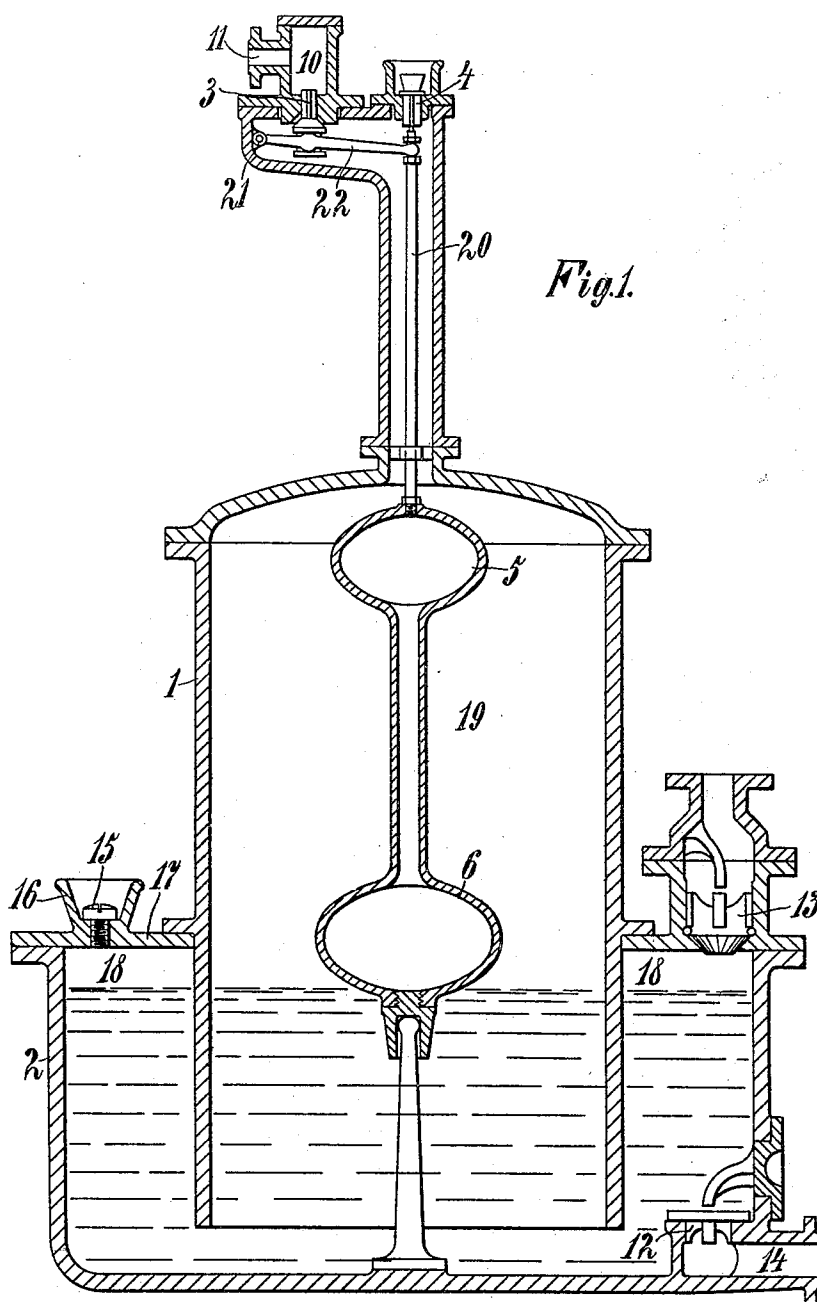
PATENTED AUG. 16, 1904.

V. SCHWANINGER.
APPARATUS FOR EXHAUSTING VAPORS OR GASES.

APPLICATION FILED JAN. 9, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

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C. Hermann

Inventor.

Vitus Schwaninger
by B. Singer

Att'y.

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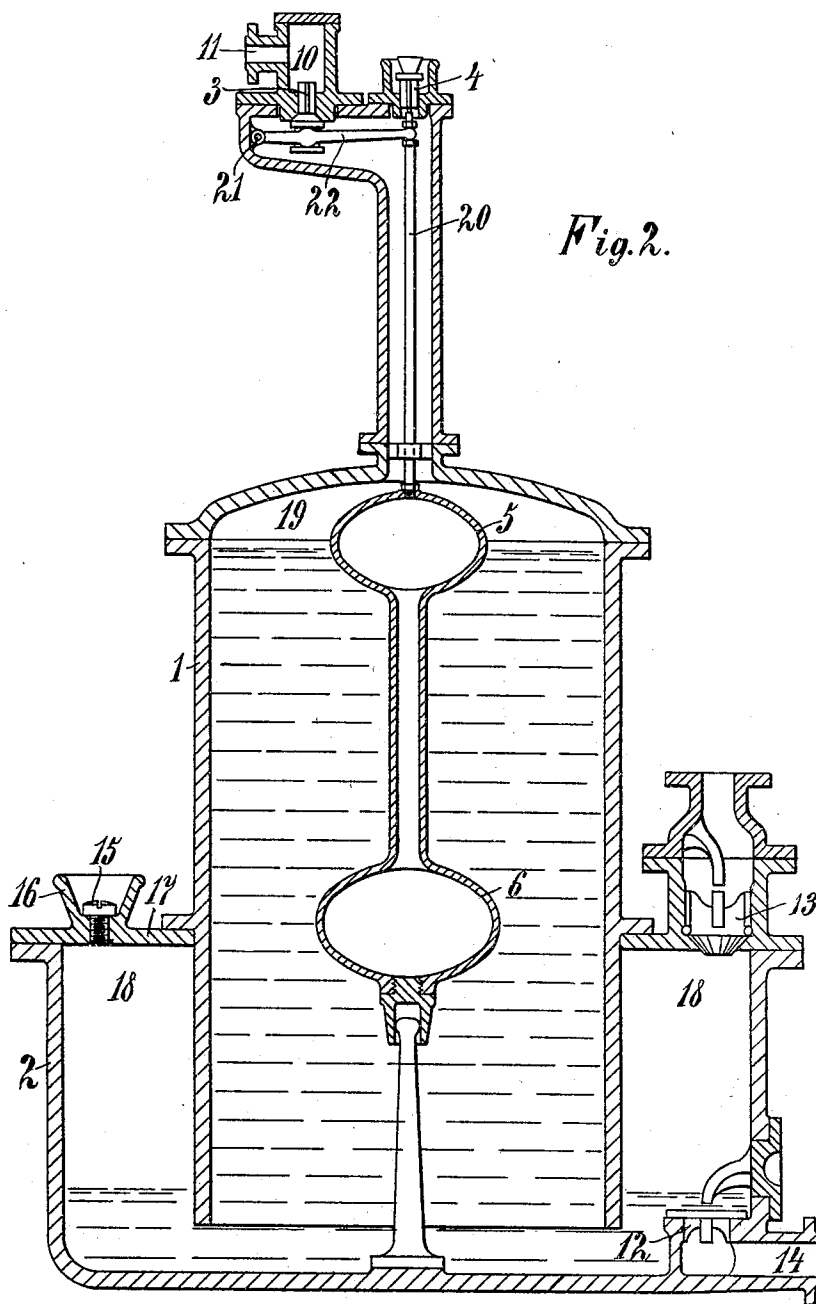


Fig. 2.

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UNITED STATES PATENT OFFICE.

VITUS SCHWANINGER, OF OGGERSHEIM, GERMANY.

APPARATUS FOR EXHAUSTING VAPORS OR GASES.

SPECIFICATION forming part of Letters Patent No. 767,502, dated August 16, 1904.

Application filed January 9, 1903. Serial No. 138,397. (No model.)

To all whom it may concern:

Be it known that I, VITUS SCHWANINGER, a subject of the German Emperor, and a resident of Oggersheim, near Mannheim, in the Empire of Germany, have invented certain new and useful Improvements in Apparatus for Exhausting Gases or Vapors, of which the following is a specification.

This invention relates to an apparatus for drawing off or exhausting gases or vapors from receptacles, chambers, or the like.

It consists more particularly in an apparatus adapted to be used with any form of air-pump whereby the exhausted gases or vapors may be discharged without coming in contact with said pump. The apparatus comprises two chambers containing a sealing liquid and communicating with each other at the bottom, one of which can be connected alternately with the suction of an air-pump by means of a self-regulating valve and with the atmosphere by means of a second self-regulating valve. The other chamber is provided with a suction-valve and exhaust-valve to allow for drawing in and discharging the gas. The liquid is therefore alternately sucked into the first chamber from the second chamber and then allowed to flow back into the second chamber in such a manner that it may be characterized as a "liquid-piston," which moves up and down in the second chamber and which sucks the gases or vapors from the chamber to be exhausted during one movement and expels or discharges said gases or vapors through an exhaust-valve during the other movement.

In the accompanying drawings, illustrating one form of this invention, Figure 1 shows a sectional view through the apparatus with the liquid in normal position. Fig. 2 is a similar view showing the liquid in raised position or in position at the end of the suction movement.

As shown in the drawings, the apparatus consists of two chambers 1 and 2, which communicate with each other at the bottom. Chamber 1 is preferably suspended in chamber 2, as shown in the drawings. The first chamber, 1, can be connected alternately with the suction or vacuum chamber of an air-pump

(not shown in the drawings) by means of a valve 3, a valve-chamber 10, and pipe 11 and with the outer atmosphere by means of a valve 4. These valves are automatically controlled by means of a double float 5 6. This double float is provided with a rod 20, which engages with the valve 4 and is adapted to raise the latter. A lever 22 is pivoted to the casing at 21 and has its free end connected with the rod 20 and is adapted to close the valve 3 when the floats are in raised position. However, this float may be replaced by other means as desired. The vessel 2 communicates with the chamber to be exhausted by means of a valve 12 and pipe 14 and is also provided with a valve 13 for the discharge of the gas or vapor exhausted from said chamber.

The operation of this invention is as follows: The screw 15 is removed and the chambers 1 and 2 filled with a sealing liquid through the funnel 16 until the surface of said liquid has reached the position shown in Fig. 1. As shown in this figure, the liquid does not touch the upper wall 17 of chamber 2, so that there is a space 18 filled with gas above the liquid in this chamber. The funnel 16 is then closed by means of the screw 15, and the apparatus is connected at 11 with an air-pump. The double float 5 6 is now in its lowest position, allowing the valve 4 to close and the valve 3 to be opened. As soon as the air-pump has exhausted the air from the chamber 11, chamber 10, and space 19 above the fluid in the chamber 1 the equilibrium of the sealing liquid is disturbed, as the gas in the space 18 is under atmospheric pressure, while the gas in the space 19 is under reduced pressure on account of the action of the air-pump. Therefore the sealing liquid will be sucked from the chamber 2 into the chamber 1, causing a fall in the liquid-level in chamber 2 and a second reduction in the pressure of gas in the space 18 above the liquid-level. The gases or vapors to be exhausted being also under atmospheric pressure which is greater than the pressure in the space 18 will open the suction-valve 12 and pass in the form of bubbles through the sealing liquid in chamber 2 into the space 18, where the pressure will gradually be in-

creased. This increase of pressure will cause a further rise in the liquid-level of chamber 1 and a corresponding fall in the liquid-level of chamber 2 until the pressure in the space 18 has decreased again, and through pipe 14 and suction-valve 12 more gas passes into the space 18. This process will continue until the liquid in chamber 1 has risen so high that it wholly or partly surrounds the upper part 5 of the float, as shown in Fig. 2. This will cause the float to rise, and in doing so it will close the valve 3 through the lever 22 and at the same time will open the valve 4 by means of the rod 20. By this means the chamber 1 is cut off from the air-pump and is placed in communication with the outer atmosphere. The atmospheric pressure on the liquid column in the chamber thereupon causes the liquid to flow down and return to the chamber 2 until it will again have the same level in both chambers, as in Fig. 1, so that the suction-valve 12 will be closed and the gases and vapors in the space 18 which have been sucked up will be discharged through the valve 13 and escape from the chamber 2. The valve 3 remains closed under the pressure of the outer atmosphere, and the float remains in its upper position until the falling liquid-level reaches the lower body 6 of the float. When the level of the liquid has partly or completely cleared the lower float-body, the float descends by gravity, overcoming the pressure of the outer atmosphere on the valve 3, and allowing the valve 4 to close. The original conditions are now reestablished—that is to say, the chamber is again in communication with the air-pump, so that the sealing liquid will again be caused to ascend in the chamber 1, and the above-described operation will be re-

peated until the gases are sufficiently exhausted from the vessel to be discharged.

Having now fully described my invention, I declare that what I claim is—

1. In an apparatus for exhausting gases or vapors, the combination of a vessel containing a sealing liquid, a chamber projecting downwardly into said vessel and communicating therewith and having an open bottom, means for connecting said chamber with an air-pump, a valve in said chamber opening into the atmosphere, means for connecting said vessel with a receptacle to be exhausted and a valve in said vessel opening into the atmosphere, substantially as and for the purpose set forth.

2. In an apparatus for exhausting gases or vapors, the combination of a vessel, a sealing liquid substantially filling said vessel, a chamber projecting downwardly into said vessel and communicating therewith at its bottom part, a pipe leading from said chamber and adapted to be connected with an air-pump, a valve in said pipe, a second valve in said pipe leading to the atmosphere, a float adapted to close said first-named valve and open said second-named valve when the liquid rises in said chamber, a suction-pipe leading from said vessel adapted to connect with the receptacle to be exhausted, a valve in said pipe, and a valve connected with said vessel and adapted to open into the atmosphere, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

VITUS SCHWANINGER.

Witnesses:

JACOB ADRIAN,
H. W. HARRIS.