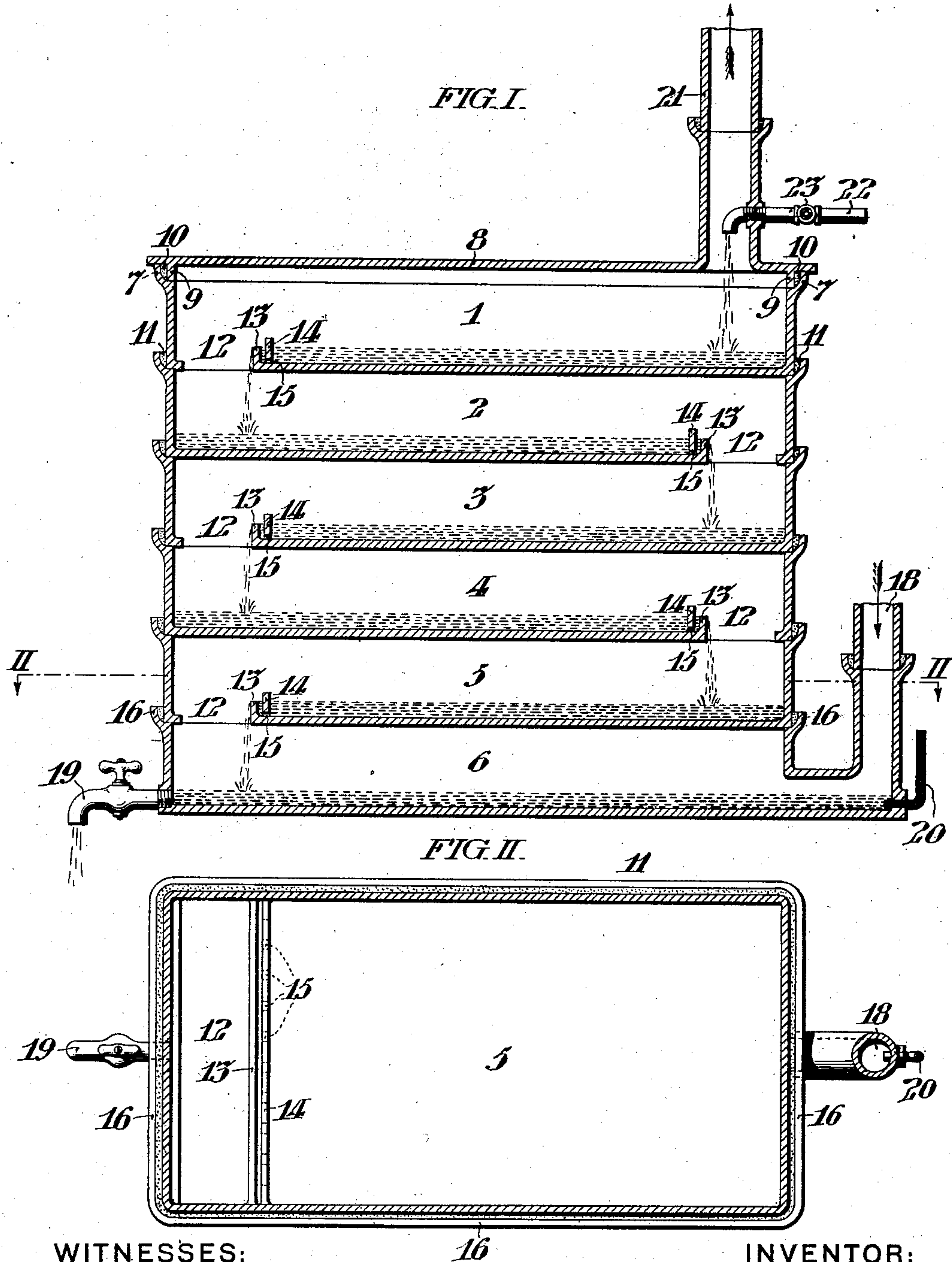


No. 755,705.

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H. G. SCHANCHE.
CHEMICAL ABSORPTION APPARATUS.
APPLICATION FILED DEC. 14, 1903.

NO MODEL.



WITNESSES:

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SYLVANIA, A CORPORATION OF PENNSYLVANIA.

CHEMICAL ABSORPTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 755,705, dated March 29, 1904.

Application filed December 14, 1903. Serial No. 185,068. (No model.)

To all whom it may concern:

Be it known that I, HERMAN G. SCHANCHE, a citizen of the United States, and a resident of No. 3401 Grays Ferry road, Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Chemical Absorption Apparatus, whereof the following is a specification, reference being had to the accompanying drawings.

My invention is primarily intended for use in connection with those chemical processes in which a gas or vapor is absorbed by a liquid, as in the manufacture of nitric acid, sulfuric acid, &c.; and its main purpose is to increase the degree of concentration directly resulting from the absorption process itself, the method of operation permitting a very slow flow of the absorbing liquid through the apparatus under the most advantageous conditions for attaining saturation.

Referring to the drawings, Figure I represents a vertical longitudinal section through an apparatus embodying my invention, and Fig. II is a horizontal section through the same on the line II II in Fig. I.

The apparatus in its entirety comprises a "tower" or structure subdivided by horizontal partitions, so as to form a vertically-arranged series of chambers communicating with one another, as is usual in this type of devices. Such structure may, however, be conveniently built up of similar units superimposed upon one another, and this is the embodiment selected for illustration.

In said drawings the tower comprises the group of superimposed units 1 2 3 4 5, which are similar in construction to one another, so that the description of one will suffice for all, the bottom member 6, however, being different from the others.

The unit 1 consists of an oblong rectangular open vessel, the walls or sides of which have the upper edge flared outwardly, as indicated at 7, to form a seat either for the bottom edge of a similar unit or for a cover, which latter is indicated in the present instance at 8, said cover having a depending flange 9, which fits snugly upon the bottom of the recess formed

by the flaring edge 7, a tight joint being secured by means of luting 10, and a similar luting 11 being applied at the joint with the subjacent vessel 2.

At one end of the vessel 1 is an opening 12, extending preferably across the whole width and provided at its inner edge with a vertical wall 13, whose upper edge is arranged at such a height above the bottom of the vessel as is desired for the maintenance of the permanent level of liquid therein. Adjacent to said wall 13 is a barrier 14 of greater vertical height than the wall itself and having passages 15 extending through it whose lower surfaces are flush with the bottom of the vessel itself. As shown in Fig. I, the series of units having the characteristics just described is arranged with the openings 12 alternately at opposite ends. The base of the tower is formed by the vessel 6, similar in contour to the others and having its upper edge 16 flared outwardly to seat the bottom unit 5. The vessel 6 is provided with an inlet-pipe 18 for gas or vapor and a discharge-cock 19 for the liquid contents, a gage 20 being also a convenient adjunct to exhibit the depth of liquid within the vessel.

The top 8 is provided with an exit-pipe 21 for spent gas or vapor and with an inlet-pipe 22, controlled by a valve 23, for the water or other liquid which is to constitute the absorbing medium.

The operation is as follows: A current of gas or vapor introduced at 18 flows successively upward through the series of subdivided compartments formed by the several vessels and ultimately passes out at the exit-pipe 21. A stream of water or other liquid entering at the pipe 22 flows into the upper vessel 2 and overflowing at the upper edge of the wall 13 passes down to the next vessel, and so on through the series, being ultimately received in the bottom vessel 6 after it has completed its travel through the apparatus. It will be observed that by reason of the barrier 14 the liquid which overflows at the upper edge of the wall 13 must be that which is drawn from the lowest layer in each vessel, since the passages through which alone the

liquid can reach the opening 12 are at the extreme bottom portion of the barrier. Thus the liquid which overflows from each receptacle into the next subjacent one is the densest portion of the contents or, in other words, that portion which is most completely saturated with the gas or vapor. On the other hand, the surface of the liquid in each receptacle which is presented to the gas or vapor is the least highly charged, and therefore the most susceptible. It will thus be noted that a very slow flow of liquid can be maintained throughout the apparatus with the most beneficial results, since the discharge from each receptacle into the next and the ultimate discharge at the end of the series is limited to that portion of the contents which in each instance is nearest to saturation. As is usual in this class of apparatus, the incoming gas or vapor, which is, so to speak, the strongest, is presented to the most highly-charged liquid and the nearly spent gas or vapor is presented to the freshest liquid; but to this feature my improvements superadd the further desideratum of constantly presenting to the gas-current in all parts of the apparatus the freshest or most susceptible layers of liquid, thus affording the best conditions for maximum absorption.

Having thus described my invention, I do not wish to be understood as broadly claiming the use of a series of compartments having alternately-arranged openings in apparatus intended for the flow of liquid to effect absorption, as I am of course aware that such structures are old.

My invention relates to the device whereby the flow of liquid is so controlled in each compartment as to compel the overflow to be drawn from the lowest layer of liquid therein, and while the appropriate embodiment of such

a device is in a tower or other structure comprising a plurality of vessels I desire to claim the individual units embodying the peculiar construction stated. In setting forth the preferred form of discharge-orifice I have shown it as extending across the whole width of the vessel and as provided on but one side by the wall 13 and barrier 14. Obvious modifications may, however, be employed without departing from the principle above indicated, it being only necessary that there should be an overflow arranged at a suitable level and a barrier so related thereto as to prevent access of the upper portion of liquid, while permitting the passage of the lowest layer thereof to the region of overflow.

Having thus described my invention, I claim—

1. In an absorption apparatus, the combination of a series of vertically-arranged compartments communicating by means of overflow-orifices alternately arranged, and means substantially as set forth, whereby the access of liquid to the respective regions of overflow is restricted to the bottom layer of liquid in each compartment.

2. In an absorbing apparatus, a vessel having a discharge-opening in its bottom; a wall adjacent to said opening; and a barrier of greater height than said wall arranged in the described relation thereto, said barrier being provided with an opening at the level of the bottom of the vessel, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 10th day of December, 1903.

HERMAN G. SCHANCHE.

Witnesses:

ARTHUR E. PAIGE,
JAMES H. BELL.