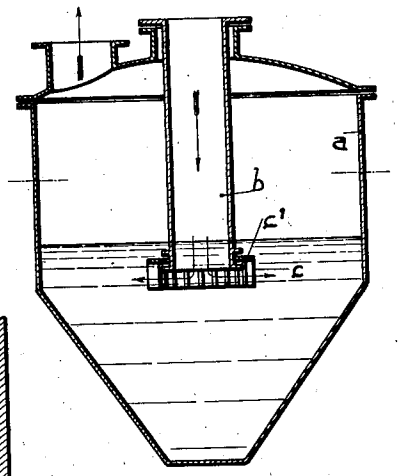
May 20, 1930. J. SCHAEFER 1,759,282

WASHER

Filed June 27, 1925

Fig. 1



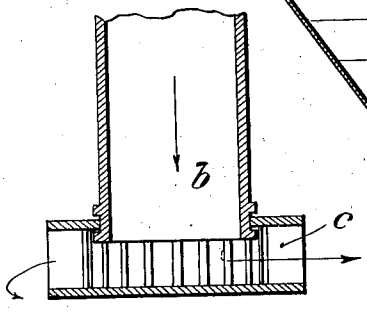
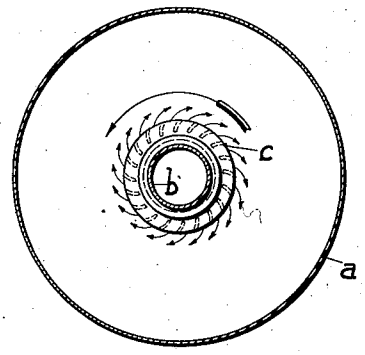


Fig. 1a

Fig. 2



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UNITED STATES PATENT OFFICE

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WASHER

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This invention has reference to washing apparatus for chemical and similar purposes, and it refers in particular to washing apparatus for acid and alkaline gases and vapors as used in connection with the manufacture of salts from the same, and it is one of the chief objects of my invention to overcome the clogging of the admission or exit pipes or openings used in connection with the washers referred to. In the manufacture of salts by means of pipes carrying one of the reagents into a tank charged with the other reagent, thus for instance in the manufacture of ammonium-salts from gases or vapors containing ammonia, great difficulties have been experienced by the very annoying deposits of salts at the submerged end of the dipping tube arranged in an acid tank; and with a view of overcoming these difficulties, it has been suggested to provide the dipping or admission tube outside of the washer with rotating means for the prevention of the depositing of salt at the tube; but this suggestion was open to the objection that such mechanical rotating means consume an appreciable amount of driving power, and moreover, necessitate the tightening of the rotating dipping tube with relation to the main conduit, which is usually stationarily arranged. In accordance with my invention this previous suggestion is improved upon by providing the dipping tube at its lower end with a crown of nozzles or blades, vanes or the like, only this nozzle or blades carrying frame being rotatably disposed and in such a manner that the gas discharged from these nozzles, blades or the like by its momentum will be able to impart a rotation to this comparatively small and light-weighted part to which, moreover, a certain upward buoyancy is imparted by the upward movement of the gas or vapor against the surface of the carrying crown, so that there is no further necessity of mechanical rotation and of special tightening means.

The invention is shown by way of example on the accompanying drawing in Figure 1 in vertical and in Figure 2 in horizontal sectional view.

Fig. 1[a] is a detailed sectional view showing the construction of the revolving eduction member.

The submerged end of the dipping pipe *b* of the acid saturator *a* or the like is provided with a closed bottom, but it is free to communicate with the apertures in a circular crown or frame of nozzles, blades, vanes or the like *c* rotatably mounted on said lower pipe end, and between the blades the gases or vapors which pass through the pipe *b*, for instance in the downward direction, are adapted to escape, and in consequence thereof they impart to the crown a rotating movement in a direction opposite to their direction of outflow, as shown by the arrows in Figure 2 of the drawing. At the same time a certain upward buoyancy is given to the said crown or frame carrying the nozzles, blades or the like by the stream of the gas flowing along and against its upper surfacee c^1, so that said frame while admitting of being journaled in a very simple manner is very easily movable, and this the more, since it is continuously lubricated by the washing liquid. The gaseous or vaporous agent descending through the admission pipe *b*, particularly in the case of the combination of ammonia with an acid liquor, as contemplated in this invention, is most eagerly absorbed by the liquid and an aspirating action is produced thereby in the interior of the pipe in addition to the natural spiral movement which the gaseous or vaporous medium exhibits towards the surrounding wall of the pipe. The combined effect of the aspirating and spiral movement referred to and which is continued in the liquid is sufficient to produce the rotation of the freely suspended discharging means at the extremity of the admission pipe, and this action is assisted by the fact that the rotatable discharging device is of a comparatively very small diameter, only somewhat larger than the diameter of the pipe, but at a comparatively considerable distance from the wall of the container, so as to present but little weight and volume, and consequently but a very low degree of r sistance even to the comparatively low gas pressure prevailing in the usual ammonia-recovering plants or the like. In view of this action, and the

rotatable, and slightly axially yielding movement of the discharging device, and in view of the fact that it preferably extends beyond the lower end of the admission pipe, and thereby causes the gas or vapor to escape somewhat below the end of the pipe, and as a result of the slight shocks or jars, due to little, unavoidable irregularities in the flow of the gas or vapor and the rotary movement of the loosely suspended device, the deposition of solid material upon and between the apertures of said discharging member *c* and between the same and the end of the pipe *b* is prevented, and I am thus enabled to dispense with the necessity of providing special fluid-driven or otherwise operated agitating, propelling or scraping means for this purpose.

The device of the kind described may be utilized in connection with all possible washing and absorption devices, and it should be understood that, though the device has been shown and described in connection with a preferred embodiment, it is not restricted to the particular arrangement, construction and configuration of parts, and it may be applied to other uses and may be modified to better adapt it to existing conditions and without deviating from the spirit and scope of the invention, as defined in the claims hereunto appended.

I claim:—

1. In a washing and absorbing apparatus in combination, a liquid container, a relatively stationary depending admission pipe, endwise immersed in the liquid of said container, a substantially cylindrical downwardly closed, laterally apertured, cap-like discharging member, loosely guided upon the exterior of the immersed extremity of said pipe and freely rotatable thereon, of somewhat larger diameter than said pipe, communicating therewith and spaced from the walls of the container.

2. In a washing, absorbing and salt-forming apparatus in combination, a liquid container, a relatively stationary depending substantially vertically extending admission pipe, endwise immersed in the liquid of the container, a substantially cap-like, cylindrical, laterally apertured member, comprising annularly arranged vanes intermediate the lateral apertures, surrounding and guided for free rotation on the exterior of the immersed extremity of the pipe, communicating with said extremity and of somewhat larger diameter than said pipe, and adapted for slight axial movement along said extremity and a closed bottom on said member.

3. In a washing, absorbing and salt-forming apparatus in combination, a liquid-container, a relatively stationary, substantially vertical, depending admission pipe, endwise immersed in the liquid of the container, outside guides at the end of said extremity, and a substantially cap-shaped, downwardly closed and laterally apertured, cylindrical member, loosely and displaceably engaging said guides, and communicating with the interior of the pipe, of somewhat larger diameter than the pipe extremity, and adapted for free rotation around said extremity and substantially annularly disposed vanes intermediate the lateral apertures of the cap-shaped member and extending towards the interior thereof.

JOSEF SCHAEFER.