AN EFFICIENT STIRRER FOR GAS ABSORPTION.

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The most convenient way of increasing the rate of absorption of a gas in a liquid is to increase the surface of contact between the two. There are many ways of doing this, but the most of them are not applicable to laboratory work.

An efficient and simple way of increasing this surface of contact is to use a stirrer designed to distribute the gas throughout the liquid in

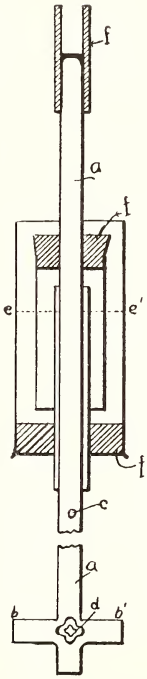

Fig. 1—Construction of stirrer: a, shaft; bb, stirring arms; c, gas entrance; d, constricted area; ee, mercury level; f, rubber connections.

the form of fine bubbles, or, better still, atomize the liquid in the presence of the gas.

An easily constructed stirrer for this purpose can be made by sealing two short glass tubes "bb'" (fig. 1) close to one end of a straight piece of glass tubing "a" long enough to serve as a shaft for the stirrer. The end of "a" below "bb'" is just long enough to reach the liquid when

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the stirrer is rotated with the arms "bb'" just free of the surface. The upper end of the shaft "a" is closed and a small hole is blown in the lower part to permit the entrance of the gas. The junction of the four tubes is constricted so that the cross-section is smallest at that point.

If this stirrer is rotated with the arms under the surface, the liquid will flow from the lower tube to the ends of the arms. Because of the contraction at the junction and the friction loss at the liquid entrance, the pressure at the center of the arms is reduced, drawing gas down the shaft through the hole "c." The liquid and gas are forced out the ends of "bb'," resulting in the gas being distributed through the liquid in the form of fine bubbles.

If the stirrer is raised so the arms are just free of the surface, gas will be drawn from the hole in the shaft and liquid through the lower tube; the two will be intimately intermixed and sprayed throughout the gas space in the containing vessel. This provides an enormous contact surface with a corresponding absorption rate.

In practice this stirrer must be rotated at a fairly high rate of speed and to prevent vibration, or rather to allow the stirrer to align itself, it should be flexibly connected with the driving mechanism. This can best be arranged by connecting the shaft with the driving axle by means of a short piece of pressure tubing. If a mercury seal is used, as is generally the case, all of its moving parts should be flexibly connected with the shaft by means of a rubber stopper or similar flexible joint.

In one particular case it was found that a stirrer of this type reduced the time of absorption from 28 to three hours.