

A NEW GAS CIRCULATING ABSORPTION STIRRER

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The apparatus to be described is a modification of the previously described Benning stirrer¹, which is used to stir a gas into a liquid. In the original form the gas and liquid are contained in a stoppered flask, gas being supplied to the flask from a gasometer as needed, through an inlet tube through the stopper. The

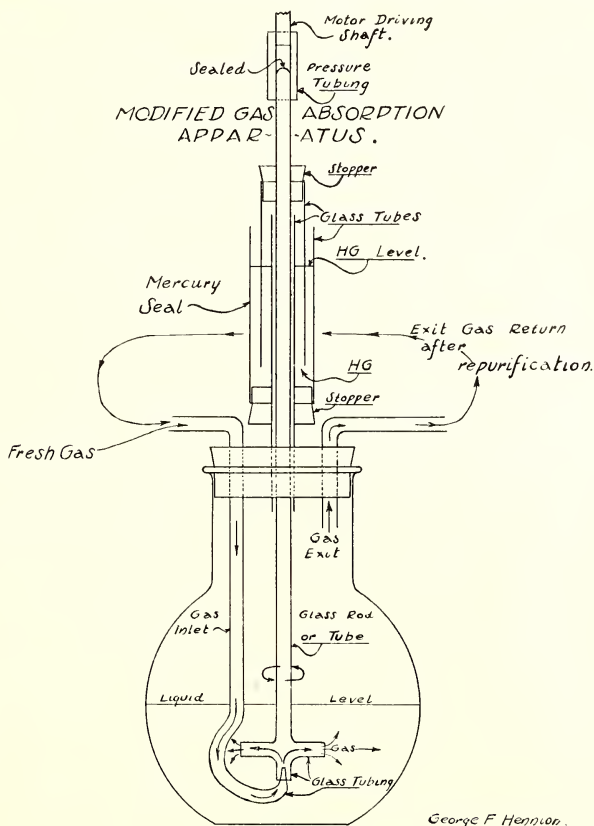


Fig. 1

stirrer consists of an inverted cross of glass tubing. The two horizontal arms and the lower vertical arm are short and open at the ends and are immersed in the liquid. The long upper vertical arm or shaft is sealed at the end and projects out through a mercury seal in the stopper, and is connected directly to the shaft of a

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¹A. F. Benning, Proc. Ind. Acad. Sci. 37:263. (1927).

small motor by means of a short piece of rubber pressure tubing. A pin hole in the hollow shaft is so placed that it leads to the gas layer in the upper part of the flask. When the stirrer is rotated on its vertical axis, liquid and gas bubbles are thrown out through the short horizontal arms by centrifugal force, and at the same time, liquid is sucked in through the short vertical arm and gas through the pinhole in the shaft.

In the modification we are about to describe, the shaft or upper vertical arm of the cross has no pinhole for the admission of gas and may be a solid rod. Instead of drawing gas directly from the upper part of the flask, the gas is led out of the flask by a tube inserted in the stopper, through any outside apparatus that may be desired, and back into the flask by another tube which dips under the liquid and terminates in a nozzle projecting up into the lower vertical arm of the stirrer. The liquid also flows into the lower vertical arm around the outside of the nozzle. The stirrer now acts as a gas pump and gives a continuous circulation of gas. The liquid in the flask may be heated and the gas stream led through a condenser, giving distillation in a current of gas. The liquid may remain cool and the gas stream may be led through solid absorbents or liquid solvents, giving continuous extraction by a gas corresponding to more common extractions by liquids. It is also possible to pass a stream of gas through two or more liquids for successive reactions and then to return the unchanged residue for a retreatment. The apparatus may be used with two immiscible liquids of different specific gravities instead of a liquid and a gas, distilling the liquid that flows out of the flask and returning the distillate to the stirrer, thus giving continuous extraction of one liquid by another.