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A DEVICE FOR THE REMOTE CONTROL MEASUREMENT OF SMALL FLOW RATES

A. W. Smith and J. H. Gross

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A DEVICE FOR THE REMOTE CONTROL MEASUREMENT OF SMALL FLOW RATES

The remote operation of an adsorption column required the continuous measurement of small flow rates (1 ml per minute). A simple device (see figure 1) was assembled and installed in the effluent stream from an ion exchange column. The high level of radioactivity in the solution made necessary the installation of all the apparatus behind thick concrete walls. The flow measuring device was mounted on a sheet of leucite so that with the help of a periscope through the concrete walls it was possible to count the drops visually. The inclusion of platinum electrodes and an electrical circuit using alternating current with a neon lamp outside the concrete wall made possible the counting of the drops by remote control and measuring of the flow rate with less effort.

The device shown in figure 1 consists of two large tubes fitted together with a ground glass joint having in the top section a capillary inlet tube, an air vent and two platinum electrodes bent in such a manner that drops of solution falling on the electrodes would close the circuit and permit the light to flash. Of necessity the solution must be a conductor and in this application contained enough salts to close the circuit. The lower portion of the tube contained an outlet to a solution collector.

Two models of this device were constructed and used. The dripping tubes, calibrated before installation, delivered 21 and 28 drops per ml and these permitted sufficient precision for this application. Had time for development permitted or continued use warranted additions would have been made to the electrical circuit to record and control the flow rate continuously.

Flow rates were not limited on the lower side but on the faster side were in large error when the flow rate became great enough so that the liquid left the dropping tip in a continuous stream and then usually missed the electrodes completely. This occurred in the range of 10 ml per minute, while 5 ml was indicated with a high degree of precision.

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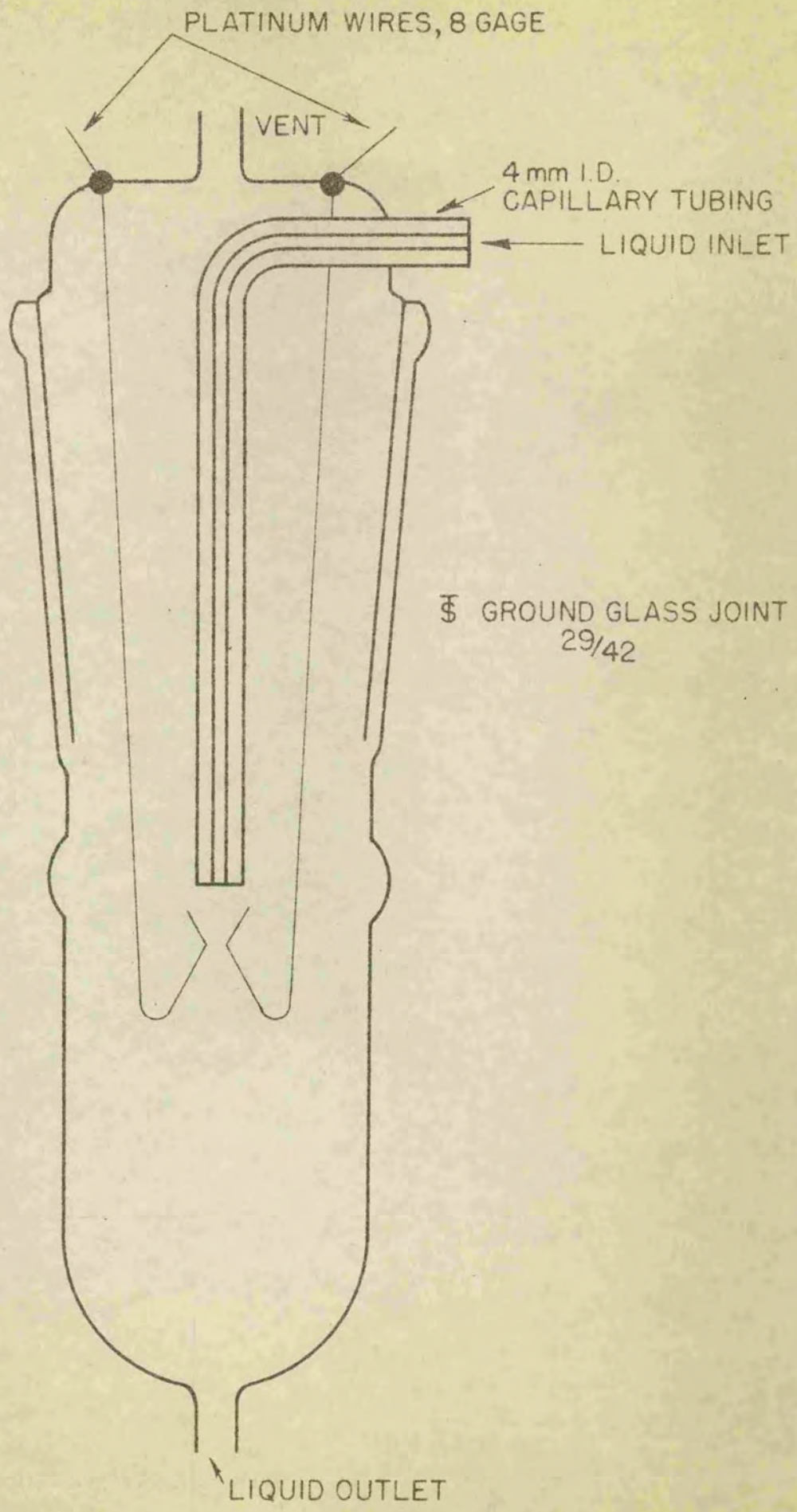

FIGURE 1