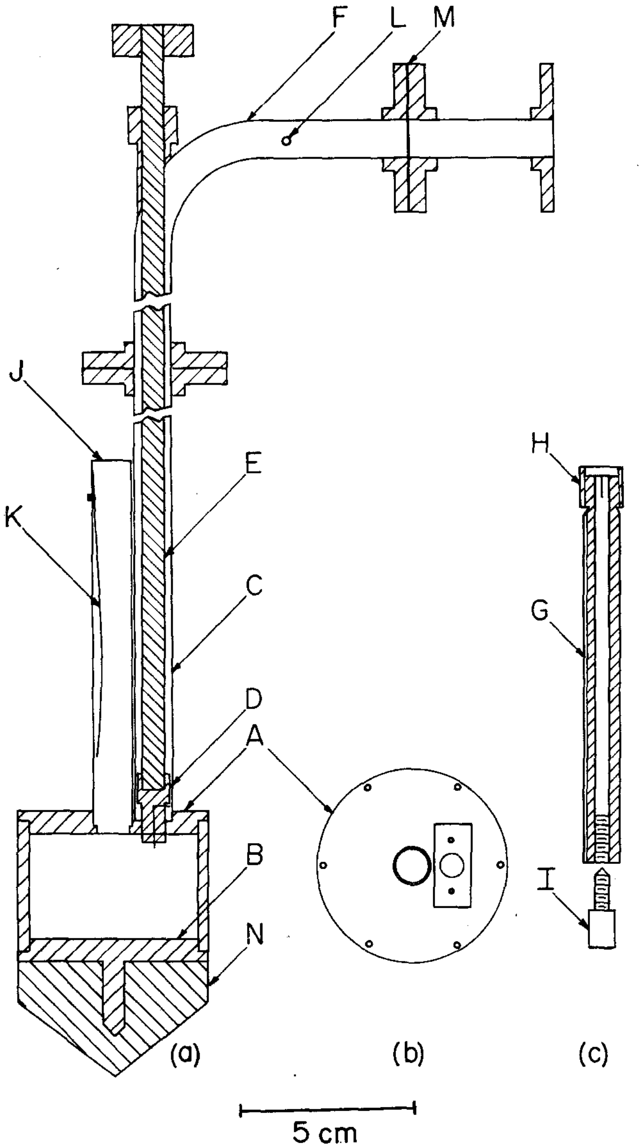

FIG. 1. Schematic diagrams (drawn to scale) of the liquid nitrogen temperature EPR cavity of cylindrical form and its accessories; (a) the cross section of the assembly, (b) top view of the cavity, and (c) cross section of the sample holder. A—Top plate of cavity; B—bottom plate of cavity; C—stainless steel waveguide; D—coupling screw; E—quartz rod; F—E bend waveguide; G—Teflon rod; H—thumb cap; I—threaded bottom tip; J—stainless steel tubing; K—phosphor bronze strip; L—He gas feedhole; M—Mylar seal; and N—plastic cone.

Mylar gasket M to prevent the escape of the helium gas. All other connecting joints are sealed by O-rings.

In order to prevent the formation of large bubbles of nitrogen gas on the bottom of the cavity a plastic cone N is screwed to the bottom of the cavity. Thus nitrogen bubbles rise to the surface before they attain any appreciable size, and contribute practically no noise to the operation of the cavity system.

The cavity and Dewar system as described here operates for approximately 2 h without refilling with liquid nitrogen. The rate of nitrogen evaporation with the cavity immersed is approximately 0.07 liters/h. The cavity can accommodate samples of approximately 1.9 cm^3. Temperatures above 77°K can be obtained by increasing the pressure of the helium gas, which then leaks around the sample rod.

* Work supported by AEC Contract No. AT(11-1)-1054.

[1] R. A. Andrews and Y. W. Kim, Rev. Sci. Instr. 37, 411 (1966).

Molecular Beam Oven Mount*

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IN molecular beam studies provision must be made for precise adjustments of the oven in a plane perpendicular to the molecular beam. In many instruments the translations have been obtained by two orthogonally mounted dovetails[1] in an arrangement whereby the motions are transmitted from outside the vacuum envelope through O-ring or bellows seals. This type of design involves a considerable construction effort and is also subject to binding and jamming from thermal expansions and chemical corrosions. Hebert[2] has described an oven mount in which some of these problems are avoided; in his instrument the horizontal and vertical motion is obtained by sliding flanges over O-ring seals, with the mechanical drives being outside the vacuum envelope.

In this note we describe a simple mount which avoids many of the difficulties inherent in earlier designs. Since no sliding seals are used, O-rings may be replaced by metal gaskets for application in ultrahigh vacuum (UHV) systems.

The schematic drawing (Fig. 1) shows the complete assembly of the mount constructed in our Laboratory. The oven translations are usually very small, only a millimeter or two in most cases, so we have replaced the pure transla-

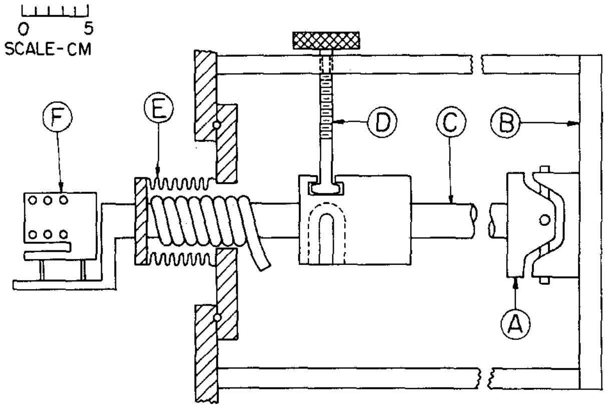

FIG. 1. Schematic drawing of oven mount assembly.

tions by motions along arcs of large radius. A large universal joint A, which is anchored to the oven chamber by an aluminum yoke B, provides the pivot point for rotations. The positioning of the oven F is accomplished by moving the shaft C with two orthogonally mounted adjustment screws D; for clarity we have shown only one of these adjustment screws in the drawing. The metal bellows E, which provides the vacuum seal for the oven mounting shaft, has been placed inside the oven chamber to facilitate removal of chemical deposits. The drawing shows the oven mount cooled by circulating water through copper tubing; in practice we have found it more convenient to circulate the water in passages milled directly in the oven mounting shaft.

* Work supported in part by the U.S. Atomic Energy Commission.

[1] N. F. Ramsey, *Molecular Beams* (Oxford University Press, London, 1956), p. 364.

[2] A. J. Hebert, Lawrence Radiation Laboratory Report, UCRL-10482 (September 1962).

Vacuum Control Circuit*

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A SIMPLE circuit, consisting of relays and switches, has been designed to monitor and control a vacuum system built for chemical manipulations. The system consisted of a 10 cm steel manifold to which subsystems for carrying out the chemical manipulations were attached. The manifold, carrying a Philips gauge sensing tube (CVC-PHG 06) feeding a monitor and control circuit (CVC-PHG 010A), was attached with a pneumatic high vacuum gate valve to a liquid nitrogen cold trap and a 10 cm oil diffusion pumping system. The diffusion pump had a thermostat mounted on its water line. The foreline pumping system was monitored by a thermocouple gauge and control circuit. An automatic two level liquid nitrogen filler was provided for the trap.

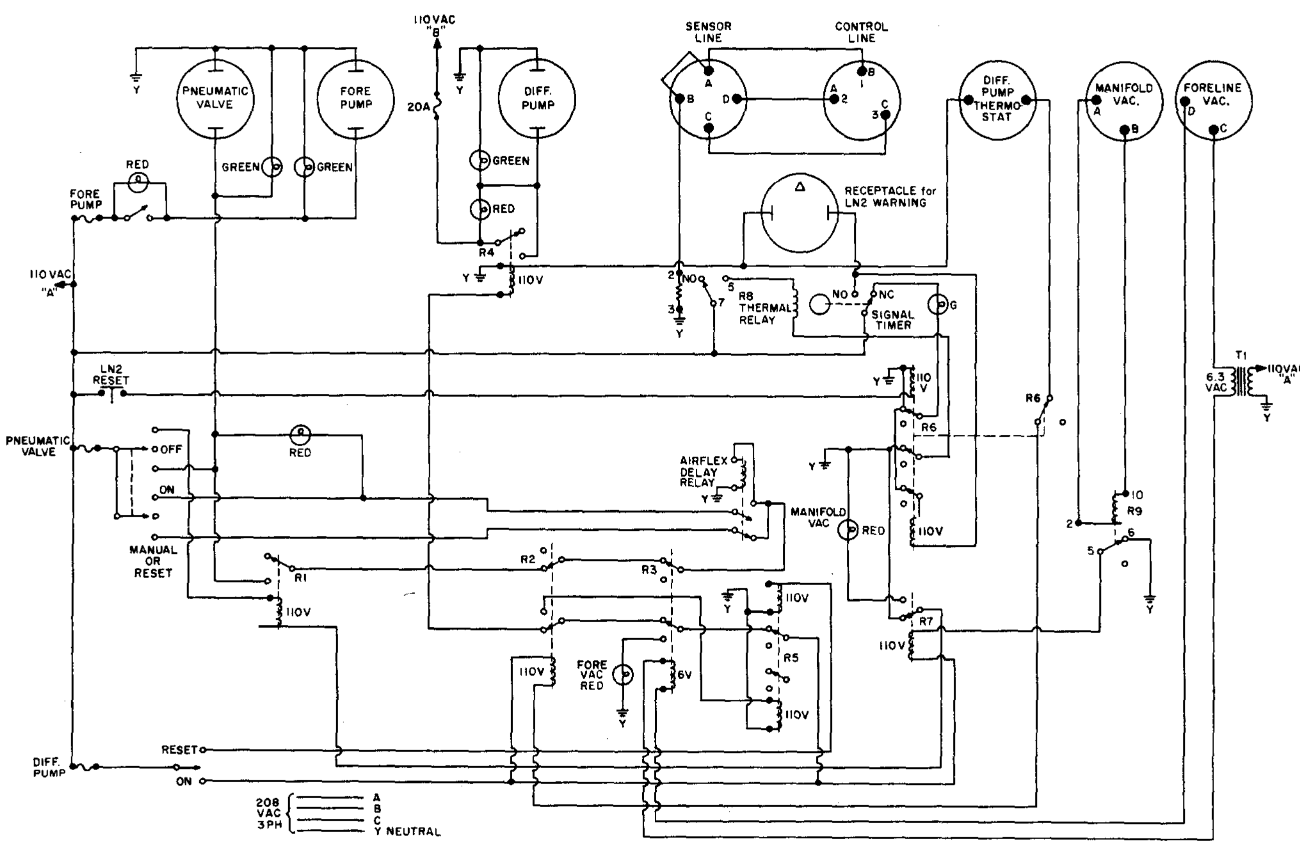

Fig. 1. Vacuum line control panel.