



Fig. 2. Optical bomb.

filling system with connections to pressure transducers (F) and (G), vacuum line, and high pressure pump. (C) is a valve for venting.

The optical bomb (Fig. 2) was designed and built by the McCartney Mfg. Company (Baxter Springs, Kan.). It was made from 4340 double vacuum melt-forged steel and had two pairs of windows at 180° for viewing of the chamber by transmitted light. Windows (1 in. dia. \times $\frac{3}{4}$ in.) made from Pyrex, Feurex, or plate glass were sealed by two sets of Neoprene O-rings, and the two end closures were of the Bridgman type. The main dimensions of the bomb cavity were 4×1 in., and the volume was 62 cc.

Pressure transducer (F) was of the SR-4 type (Baldwin, Lima, Hamilton) and read on a Dynalog (Foxboro Co.) Recorder. It measured the pressure in the optical bomb. Transducer G (Microsen Type 145: Manning, Maxwell and Moore) measured the pressure on the pump side of the system and transmitted it to an indicating voltmeter. E is a rupture disk assembly (American Instrument Company). The high pressure pump was an air operated piston pump (Type 4444-J: McFarland Mfg. Corp.). A Bourdon gauge (not shown) measured the pressure in the experiments with pentane.

The bomb (but not the coil D) could be brought to the desired temperature by immersion in an oil bath raised by an air piston. The bath temperature was sensed by a thermocouple and recorded. A steady pressure in the bomb indicated thermal equilibrium.

Materials

Six polyethylene fractions were obtained by solvent-non-solvent fractionation from a high pressure polyethylene with 1.7% methyl content,