The light source explosive was initiated simultaneously with the plane wave lens of the experimental assembly; the resulting strongly luminuous shock in the argon produced a bright reflection from the aluminized surfaces a few microseconds before the first arrival to be recorded in the quartz.

A drawing of the complete arrangement as it appeared before firing is shown as Fig. 2.3.

An abrupt change in intensity of the light reflected from the aluminized surfaces of the assembly showed arrival times of the shock fronts and free surfaces upon impact with the mirrors.

A streak camera photograph taken in this manner is shown in Fig. 2.4. The two specimens in this shot were Z-cut; the upper one was 1/8-inch thick and the lower 1/4-inch thick. The final pressure was approximately 200 kbar. At time, T_0, the reflection from the rear (aluminized) face of the quartz extinguishes abruptly as the shock arrives at the quartz-aluminum interface. At time, T_1, the first shock arrives at the quartz free surface. The traces are relatively smooth until the change in slope caused by the arrival of the second shock at time T_2; thereafter the traces are slightly irregular. A slight curvature to the trace of the first shock can be detected. This slowing up of the free-surface is due to stress-relaxation effects, as was pointed out by Wackerle(15).

For reliable results the point of collision of the quartz free surface with the inside surface of the mirror must travel with supersonic velocity with respect to both quartz and lucite (non-jetting configuration). Consequently, the initial mirror angle must be less than approximately

$$\alpha \max = \sin^{-1} \frac{u_f}{U_s}$$

where u_f is the quartz free-surface velocity and U_s is the larger of the two shock wave velocities in quartz and lucite. This criterion restricted the usable mirror angles to less than about 8°.

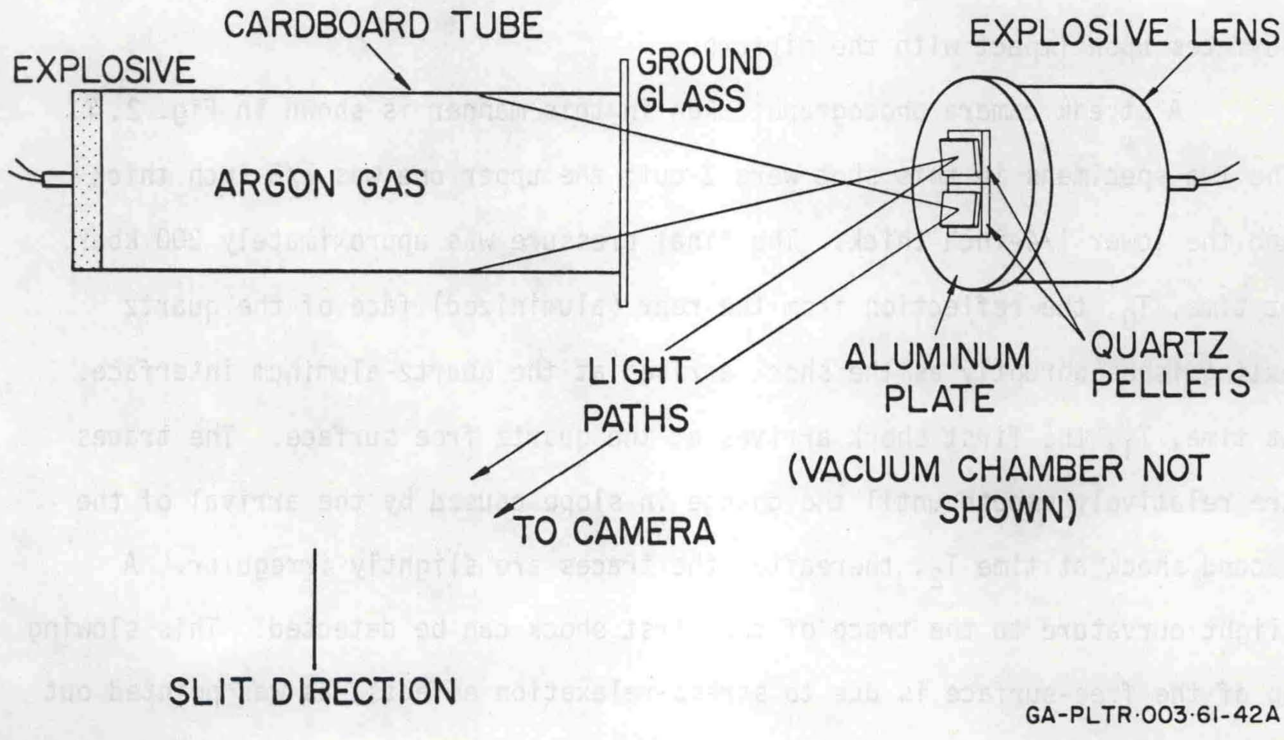

Fig. 2.3.--Diagram Showing Relation of Experimental Assembly, Light Source and Camera.