this system is called the *Paschen-Runge mount*. Other configurations based on the imaging properties of the Rowland circle are the *Eagle mount* and the *Abney mount*, both of which are described by Hutley[74] and by Meltzer.[75]

Unless the exit slits (or photographic plates) are considerably taller than the entrance slit, the astigmatism of Rowland circle mounts usually prevents more than a small fraction of the diffracted light from being recorded, which greatly decreases the efficiency of the instrument. Increasing the exit slit heights helps collect more light, but since the images are curved, the exit slits would have to be curved as well to maintain optimal resolution. To complicate matters further, this curvature depends on the diffracted wavelength, so each exit slit would require a unique curvature. Few instruments have gone to such trouble, so most Rowland circle grating mounts collect only a small portion of the light incident on the grating. For this reason these mounts are adequate for strong sources (such as the observation of the solar spectrum) but not for less intense sources (such as stellar spectra).

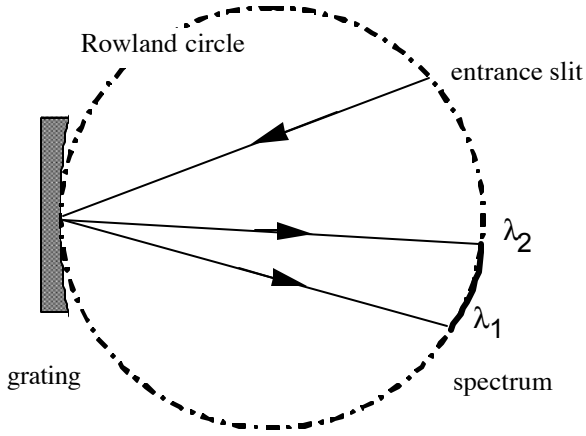


*Figure 7-5. The Rowland Circle spectrograph.* Both the entrance slit and the diffracted spectrum lie on the Rowland circle, whose diameter equals the tangential radius of

[74] M. C. Hutley, *Diffraction Gratings,* Academic Press (New York, 1970).

[75] R. J. Meltzer, "Spectrographs and Monochromators," in *Applied Optics and Optical Engineering*, vol. V (chapter 3), R. Shannon, ed., Academic Press (New York: 1969).