is usually sacrificed to achieve flux uniformity and pointing tolerance. One method of doing this is the kaleidoscope flux homogenizer. This is simply a box in front of the receiver having internal reflecting walls. When properly designed, the incoming rays are scrambled by reflecting several times and are distributed relatively uniformly over the receiver, independently of where they arrived at the entrance aperture [32, 50].

11.4.4 The Compound Parabolic Concentrator

We have seen that the parabolic concentrator is not an ideal concentrator. The first realization of an ideal concentrator was the compound parabolic concentrator (CPC). As seen in Figure 11.24, this actually comprises two parabolic surfaces; however, the axis of each is tilted by $\pm\theta_{\max,\text{in}}$ and their foci are at opposite edges of the receiver. The parabolas are extended upwards until the surface is vertical, at which point the entrance aperture is as large as possible. When light is incident at the maximum angle, it is clear that all the light hits one parabolic surface and ends up focused at the receiver edge. As the light moves toward the normal, all the rays are directed more downward and continue to hit the receiver. Using the geometry of parabolic surfaces, it is straightforward, if a little tedious, to show that $C = 1/\sin\theta_{\max,\text{in}}$. So the CPC concentrator is ideal. If the CPC is

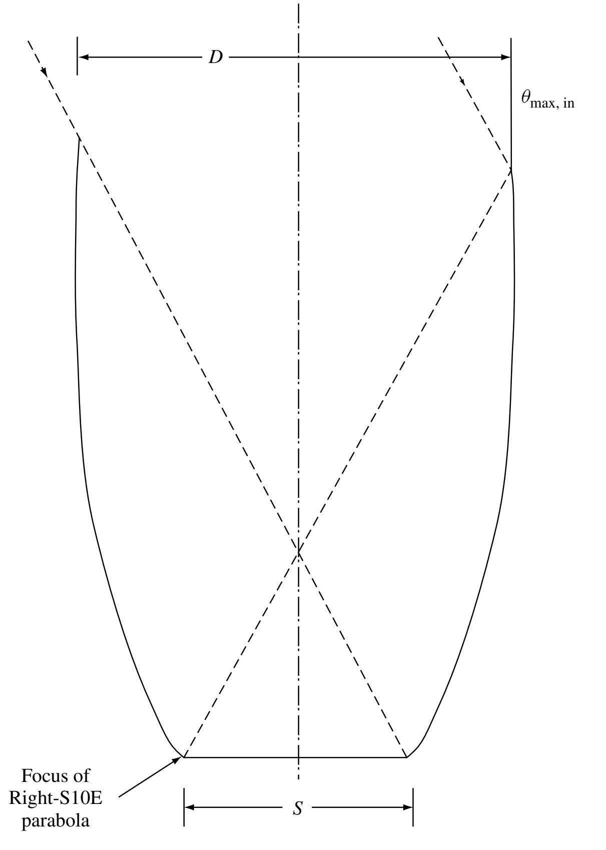

Figure 11.24 Geometry of the compound parabolic concentrator, in this case for $\theta'_{\max,\text{in}} = 30°$