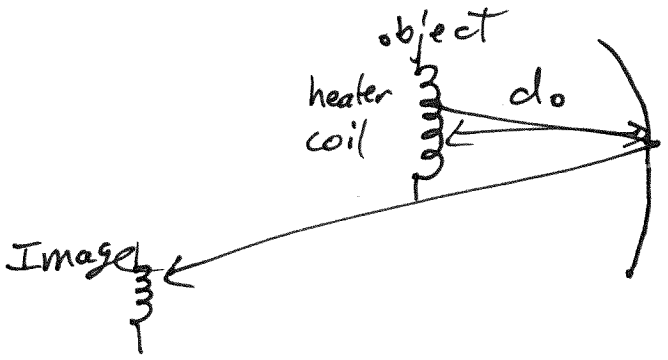
Ch. 2 Prob. 33

$R = 50.0\,cm$

$d_i = 3.00\,m$



Find the location of the hot coils

First, the focal distance is

$$f = \frac{R}{2} = \frac{0.50\,m}{2} = \underline{\underline{0.25\,m}}$$

Using the image formula

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$$

d_i is given, so solving for d_o gives

$$\frac{1}{d_o} = \frac{1}{f} - \frac{1}{d_i} = \frac{1}{0.25\,m} - \frac{1}{3.00\,m}$$

$$\frac{1}{d_o} = 4.0 - 0.333 = 3.667\,\frac{1}{m}$$

$$d_o = \frac{1}{3.667} = \boxed{0.273\,m}$$

or $\boxed{27.3\,cm}$