



**FIGURE P11-13**

Problem 11-24 An aircraft overhead bin mechanism - dimensions in inches

†11-24 In Figure P11-13, links 3 and 4 each weigh 2 lb and there are 2 of each (another set behind). Their CGs are at their midpoints. Link 3 weighs 10 lb. The mass moments of inertia of links 2, 3, and 4 are 0.071, 0.430, and 0.077 lb-in-sec<sup>2</sup> (blob-in<sup>2</sup>) respectively. Find the torque needed to begin a slow *CCW* rotation of link 2 from the position shown using the method of virtual work. Include gravity forces because the links are heavy and the speed is low.

† These problems are suited to solution using *Mathcad*, *Matlab*, or *TKSolver* equation solver programs.