



FIGURE P12-13

Problems 12-33 to 12-34

- †‡12-33 Figure P12-13 shows a fourbar linkage and its dimensions in inches. Links 2 and 4 are rectangular steel with a 1-in wide x 0.12-in thick cross-section and 0.5-in radius ends. The coupler is 0.25-in- thick aluminum with 0.5-in radii at points *A*, *B*, and *P*. Design counterweights to force balance the linkage using the method of Berkof and Lowen.
- †‡12-34 Use the data of Problem 12-33, changing link 3 to be steel with the same cross-section dimensions as links 2 and 4, to design the necessary balance weights and other features necessary to completely eliminate the shaking force and shaking moment the linkage exerts on the ground link.

† These problems are suited to solution using *Mathcad*, *Matlab*, or *TKSolver* equation solver programs. In most cases, your solution can be checked with program FOURBAR.