



**FIGURE P12-9**

Problems 12-20 to 12-23

- †‡12-20 The linkage in Figure P12-9a has rectangular steel links of 20 × 10 mm cross section similar to that shown in Figure 12-10a (p. 625). Design the necessary balance weights and other features necessary to completely eliminate the shaking force and shaking moment. State all assumptions.
- †‡12-21 Repeat Problem 12-20 using links configured as in Figure 12-10b with the same cross section but having “dogbone” end diameters of 50 mm.
- †‡12-22 The linkage in Figure P12-9b has rectangular steel links of 20 × 10 mm cross section similar to that shown in Figure 12-10a (p. 625). Design the necessary balance weights and other features necessary to completely eliminate the shaking force and shaking moment. State all assumptions.
- †‡12-23 Repeat Problem 12-22 using steel links configured as in Figure 12-10b with a 20 × 10 mm cross section and having “dogbone” end diameters of 50 mm.

\* Answers in Appendix F.

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