

**FIGURE P12-10**

Problems 12-24 to 12-26

- †12-24 The device in Figure P12-10 is used to balance fan blade/hub assemblies running at 600 rpm. The center distance between the two bearings on the machine is 250 mm. The left edge of the fan hub (plane A) is 100 mm from the centerline of the closest bearing (at  $F_2$ ). The hub is 75 mm wide along its axis and has a diameter of 200 mm along the surfaces where balancing weights are fastened. The peak magnitude of force  $F_1$  is 0.5 N at a phase angle of  $30^\circ$  with respect to the rotating  $x'$  axis. Force  $F_2$  had a peak of 0.2 N at a phase angle of  $-130^\circ$ . Calculate the magnitudes and locations with respect to the  $x'$  axis of balance weights placed in planes A and B of the hub to dynamically balance the fan assembly.
- †12-25 Repeat Problem 12-24 using the following data. The hub is 55 mm wide and has a diameter of 150 mm along the surfaces where balancing weights are fastened. The force  $F_1$  measured at the left bearing had a peak of 1.5 N at a phase angle of  $60^\circ$  with respect to the rotating  $x'$  axis. The force  $F_2$  measured at the right bearing had a peak of 2.0 N at a phase angle of  $-180^\circ$  with respect to the rotating  $x'$  axis.
- †12-26 Repeat Problem 12-24 using the following data. The hub is 125 mm wide and has a diameter of 250 mm along the surfaces where balancing weights are fastened. The force  $F_1$  measured at the left bearing had a peak of 1.1 N at a phase angle of  $120^\circ$  with respect to the rotating  $x'$  axis. The force  $F_2$  measured at the right bearing had a peak of 1.8 N at a phase angle of  $-93^\circ$  with respect to the rotating  $x'$  axis.

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