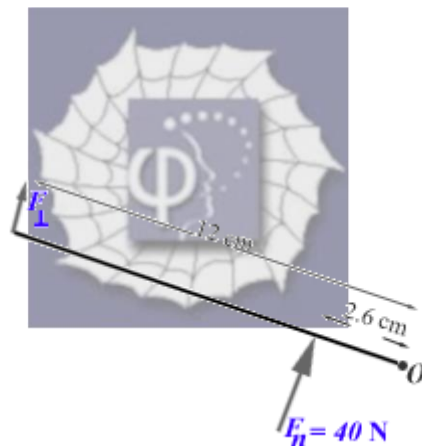


38.

**Problem 13.2E (HRW)**

*A certain nut is known to require forces of 40 N exerted on its shell from both sides to crack it. What force component  $F_{\perp}$ , perpendicular to the handles, will be required when the nut is placed in the nutcracker?*

**Solution:**



As the nut breaks when a force of 40 N is applied on it from each side, force  $F_{\perp}$  will have to be applied at ends of each handle in order that a force of 40 N develops on the nut. This force will develop because the torque about the joint of the nutcracker has to be zero.

$$F_{\perp} \times 12 \text{ cm} = 40 \times 2.6 \text{ N cm},$$

or,

$$F_{\perp} = 8.7 \text{ N}.$$

