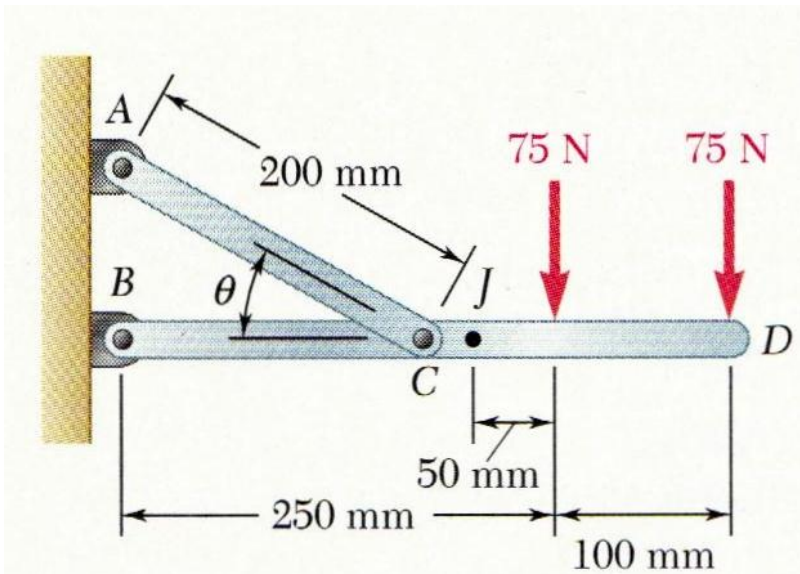


Statics Homework Handout 6b:

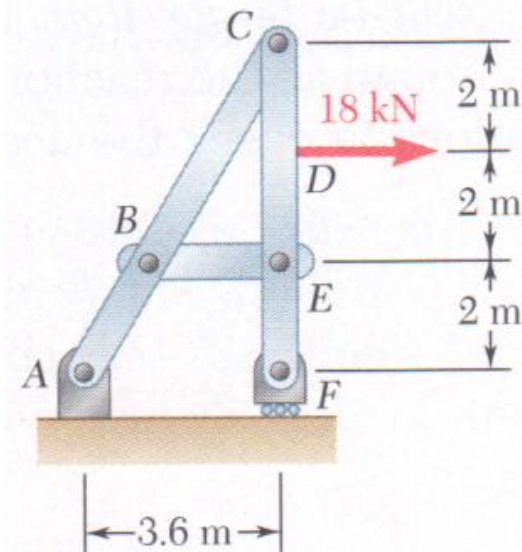
Homework Assignment #6b: 6.79, 6.85, 6.95, 6.103, 6.123, 6.133, 6.145, 6.153

**6.75** Determine the force in member AC and the reaction at B when (a)  $\theta = 30^\circ$ , (b)  $\theta = 60^\circ$ .



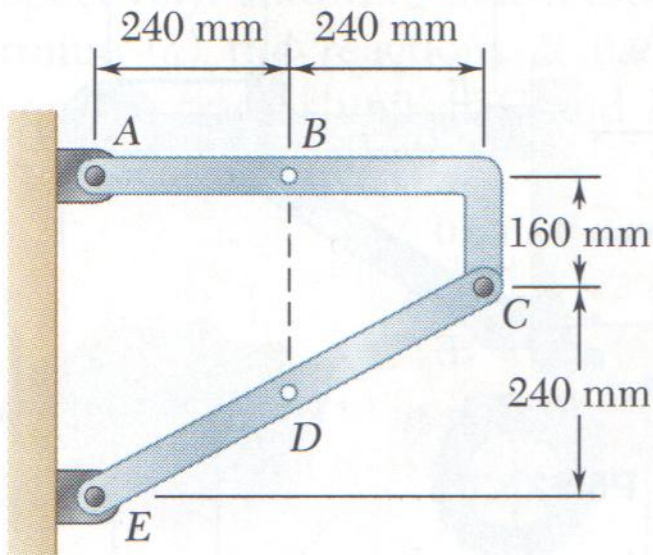
**Fig. P6.75**

**6.79** For the frame and loading shown, determine the components of all forces acting on member ABC.



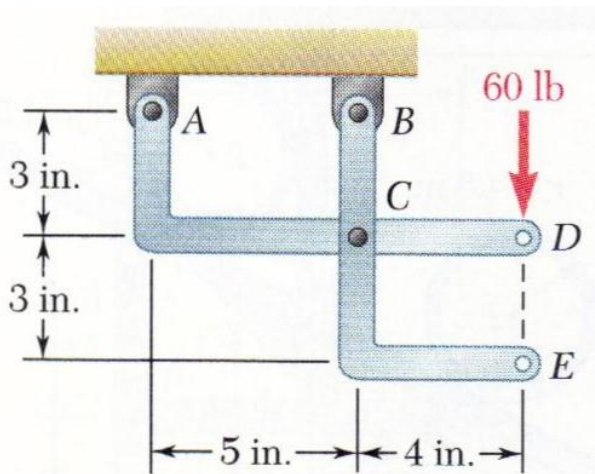
**Fig. P6.79**

**6.85 and 6.86** Determine the components of the reactions at  $A$  and  $E$  if the frame is loaded by a clockwise couple of magnitude  $36 \text{ N} \cdot \text{m}$  applied (a) at  $B$ , (b) at  $D$ .



**Fig. P6.83 and P6.85**

**6.87** Determine the components of the reactions at  $A$  and  $B$  if (a) the 60-lb load is applied as shown, (b) the 60-lb load is moved along its line of action and applied at  $E$ .



**Fig. P6.87**

**6.95** A trailer weighing 2400 lb is attached to a 2900-lb pickup truck by a ball-and-socket truck hitch at  $D$ . Determine (a) the reactions at each of the six wheels when the truck and trailer are at rest, (b) the additional load on each of the truck wheels due to the trailer.

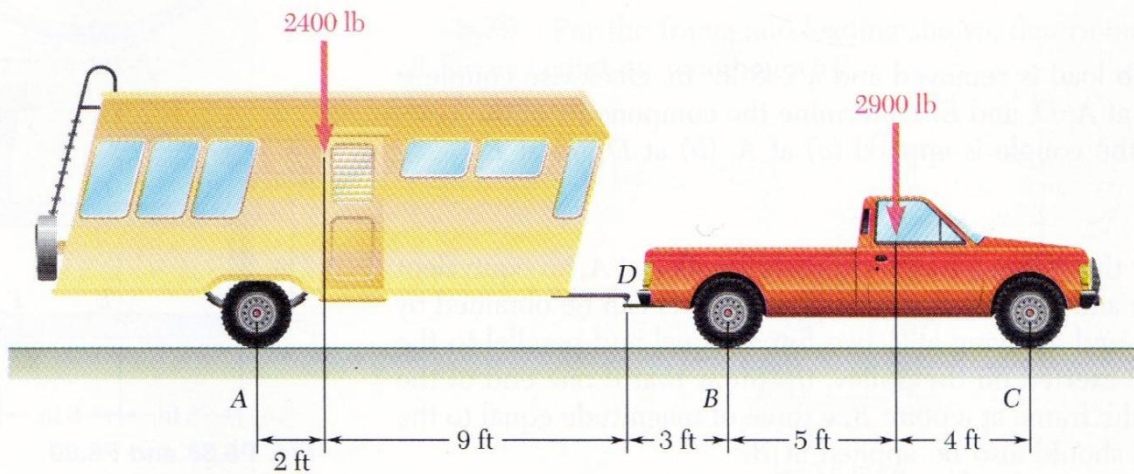


Fig. P6.95

**6.97** The tractor and scraper units shown are connected by a vertical pin located 0.6 m behind the tractor wheels. The distance from  $C$  to  $D$  is 0.75 m. The center of gravity of the 10-Mg tractor unit is located at  $G_t$ , while the centers of gravity of the 8-Mg scraper unit and the 45-Mg load are located at  $G_s$  and  $G_l$ , respectively. Knowing that the tractor is at rest with its brakes released, determine (a) the reactions at each of the four wheels, (b) the forces exerted on the tractor unit at  $C$  and  $D$ .

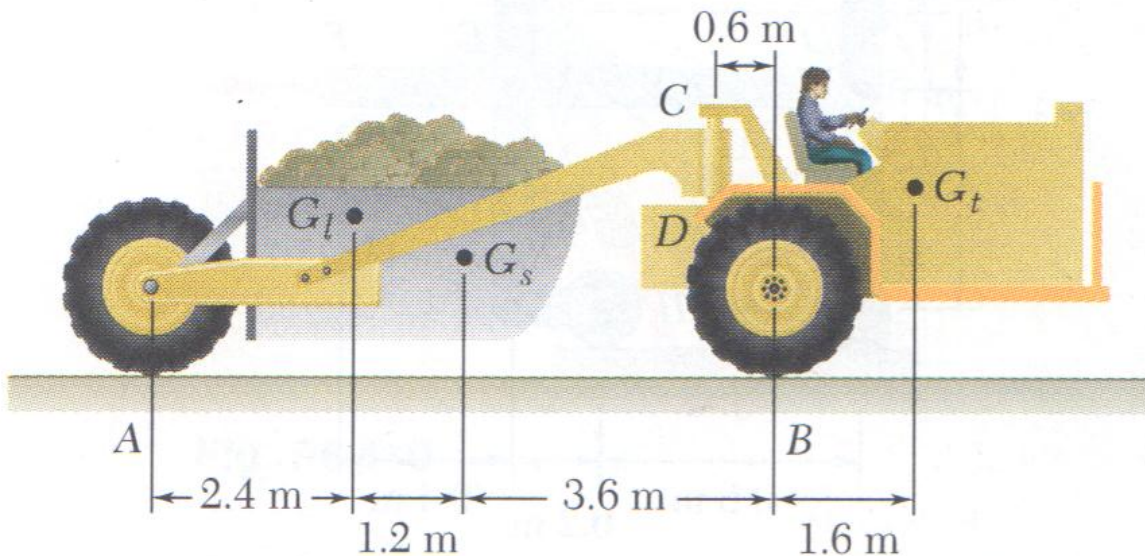
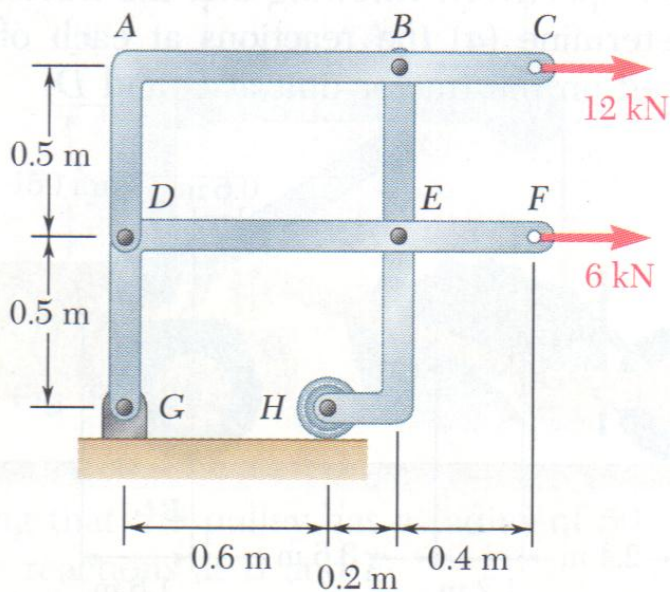


Fig. P6.97

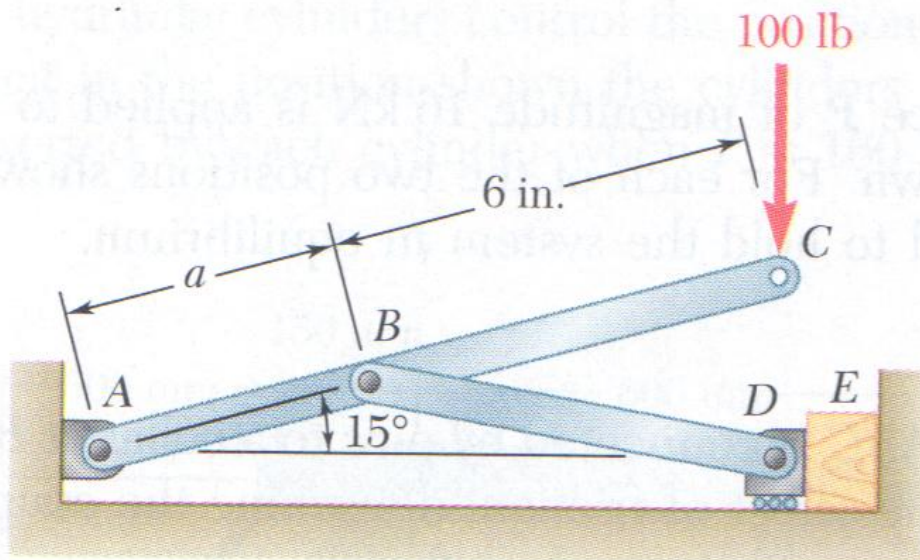


**6.103** For the frame and loading shown, determine the components of the forces acting on member  $DABC$  at  $B$  and  $D$ .



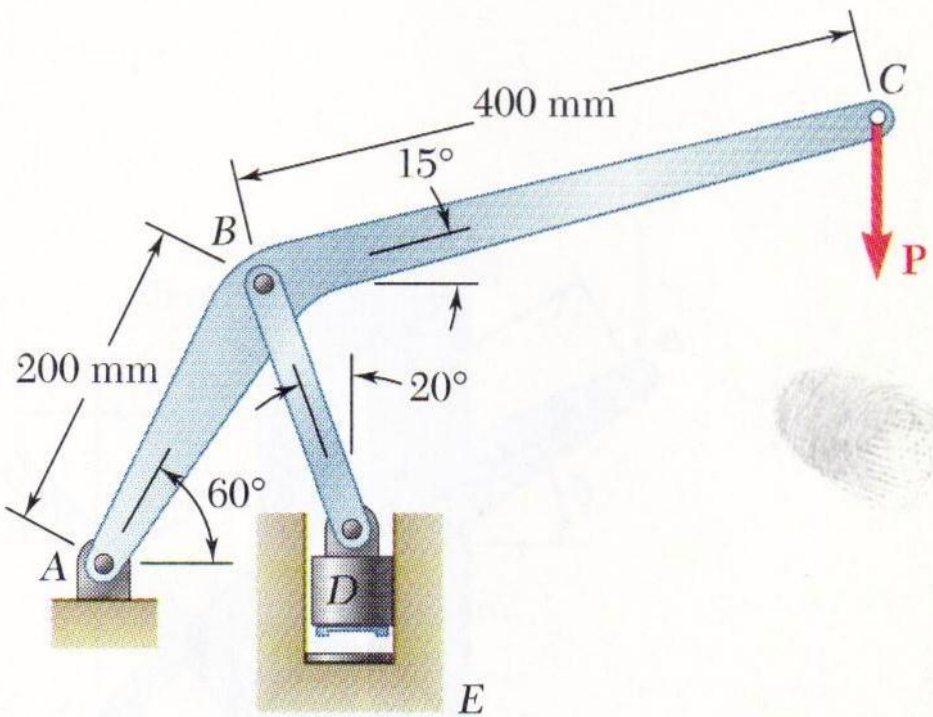
**Fig. P6.103**

**6.123** A  $100\text{-lb}$  force directed vertically downward is applied to the toggle vise at  $C$ . Knowing that link  $BD$  is  $6\text{ in.}$  long and that  $a = 4\text{ in.}$ , determine the horizontal force exerted on block  $E$ .



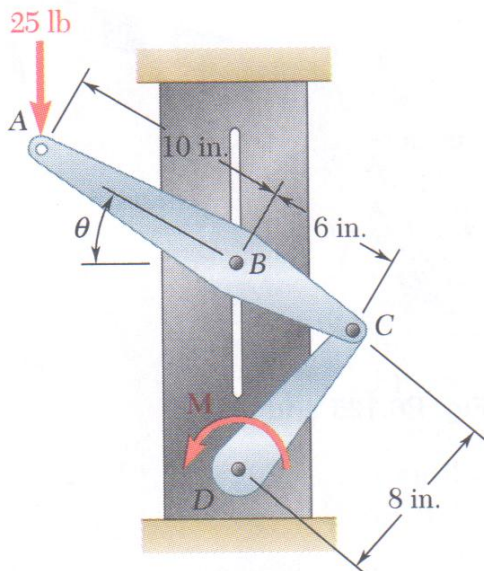
**Fig. P6.123 and P6.124**

**6.125** The press shown is used to emboss a small seal at  $E$ . Knowing that  $P = 250 \text{ N}$ , determine (a) the vertical component of the force exerted on the seal, (b) the reaction at  $A$ .



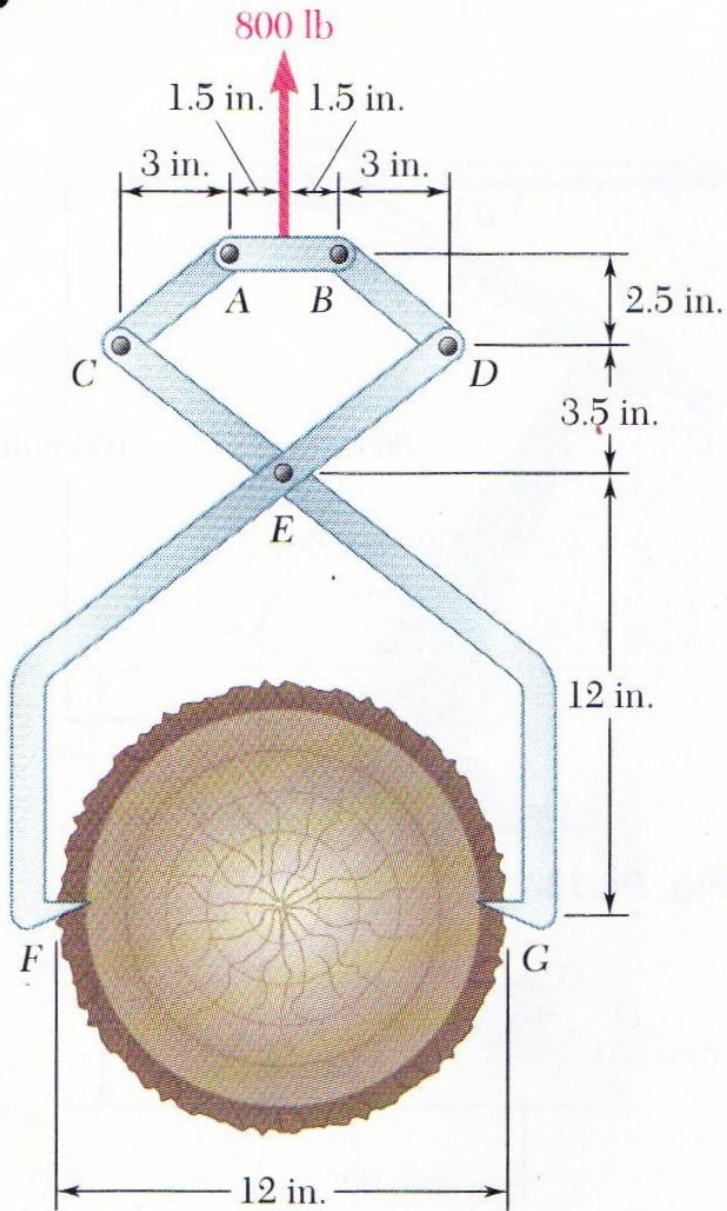
**Fig. P6.125 and P6.126**

**6.133** The pin at  $B$  is attached to member  $ABC$  and can slide freely along the slot cut in the fixed plate. Neglecting the effect of friction, determine the couple  $M$  required to hold the system in equilibrium when  $\theta = 30^\circ$ .



**Fig. P6.133 and P6.134**

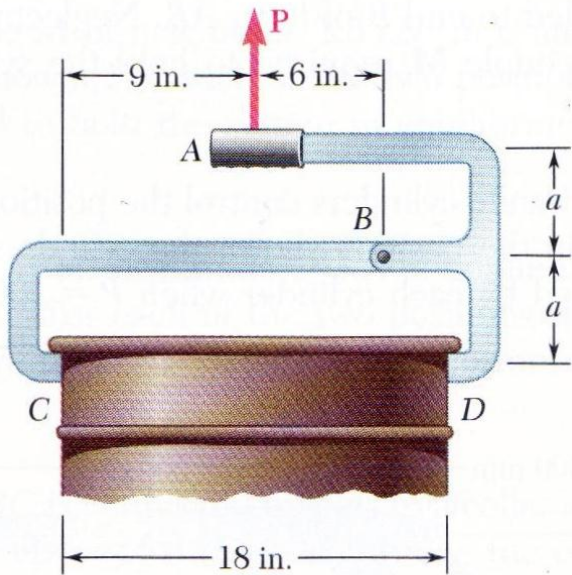
**6.143** A log weighing 800 lb is lifted by a pair of tongs as shown. Determine the forces exerted at  $E$  and  $F$  on tong  $DEF$ .



**Fig. P6.143**

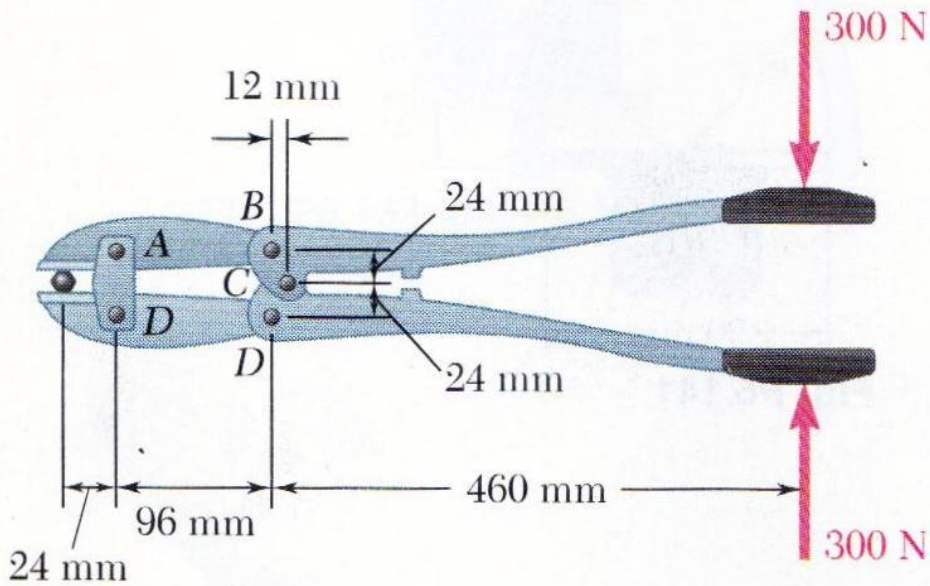


**6.144** A small barrel weighing 60 lb is lifted by a pair of tongs as shown. Knowing that  $a = 5$  in., determine the forces exerted at  $B$  and  $D$  on tong  $ABD$ .



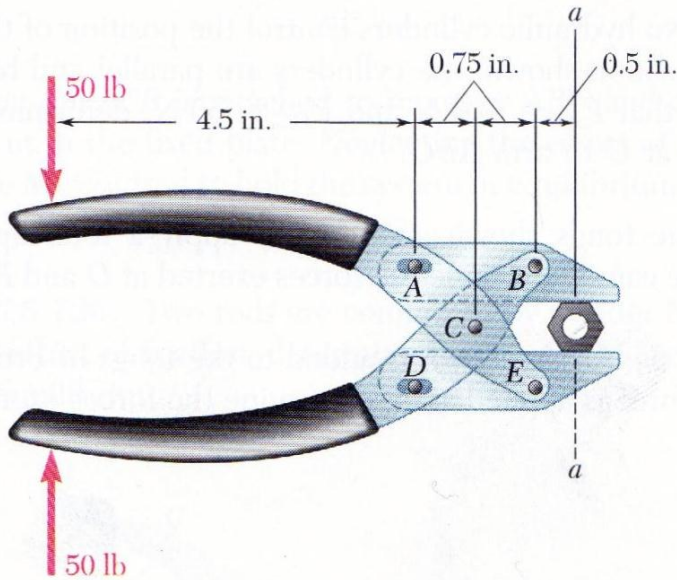
**Fig. P6.144**

**6.145** In using the bolt cutter shown, a worker applies two 300-N forces to the handles. Determine the magnitude of the forces exerted by the cutter on the bolt.



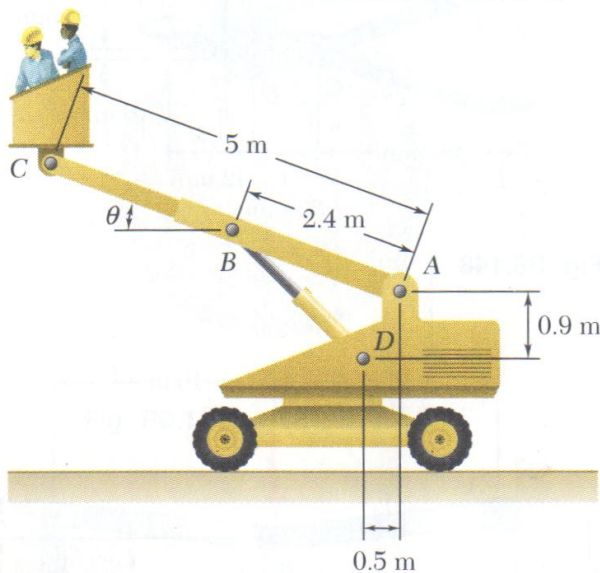
**Fig. P6.145**

**6.146** Determine the magnitude of the gripping forces exerted along line  $aa$  on the nut when two 50-lb forces are applied to the handles as shown. Assume that pins  $A$  and  $D$  slide freely in slots cut in the jaws.



**Fig. P6.146**

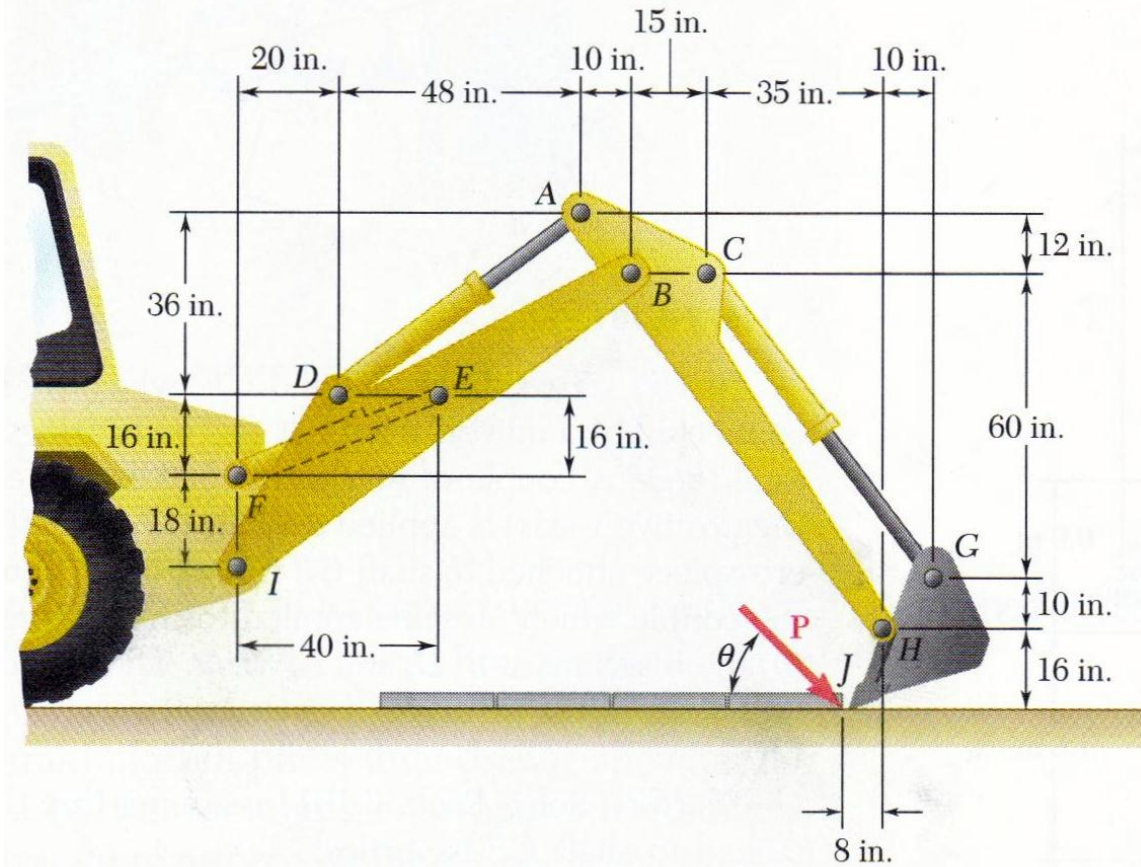
**6.153** The telescoping arm  $ABC$  is used to provide an elevated platform for construction workers. The workers and the platform together have a mass of 200 kg and have a combined center of gravity located directly above  $C$ . For the position when  $\theta = 20^\circ$ , determine (a) the force exerted at  $B$  by the single hydraulic cylinder  $BD$ , (b) the force exerted on the supporting carriage at  $A$ .



**Fig. P6.153 and P6.154**



**6.157** The motion of the backhoe bucket shown is controlled by the hydraulic cylinders  $AD$ ,  $CG$ , and  $EF$ . As a result of an attempt to dislodge a portion of a slab, a 2-kip force  $\mathbf{P}$  is exerted on the bucket teeth at  $J$ . Knowing that  $\theta = 45^\circ$ , determine the force exerted by each cylinder.



**Fig. P6.157**