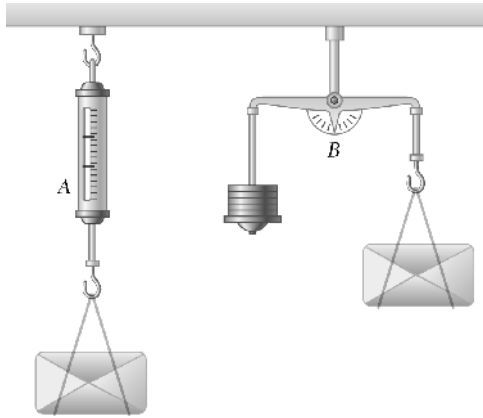


ME 104: Homework 3

Andrew Gray: University of California, Berkeley

Due Monday, September, 21st

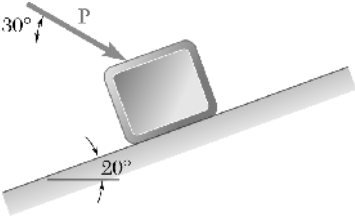
Chapter 12, Problem 4



The diagram shows two scales, A and B, suspended from a horizontal bar representing the roof of an elevator. Scale A is a spring scale with a hook at the top and a package hanging from it. Scale B is a lever scale with a central pivot point and two equal-length arms. The left arm has a stack of three weights, and the right arm has a package hanging from it. The scales are labeled 'A' and 'B' respectively.

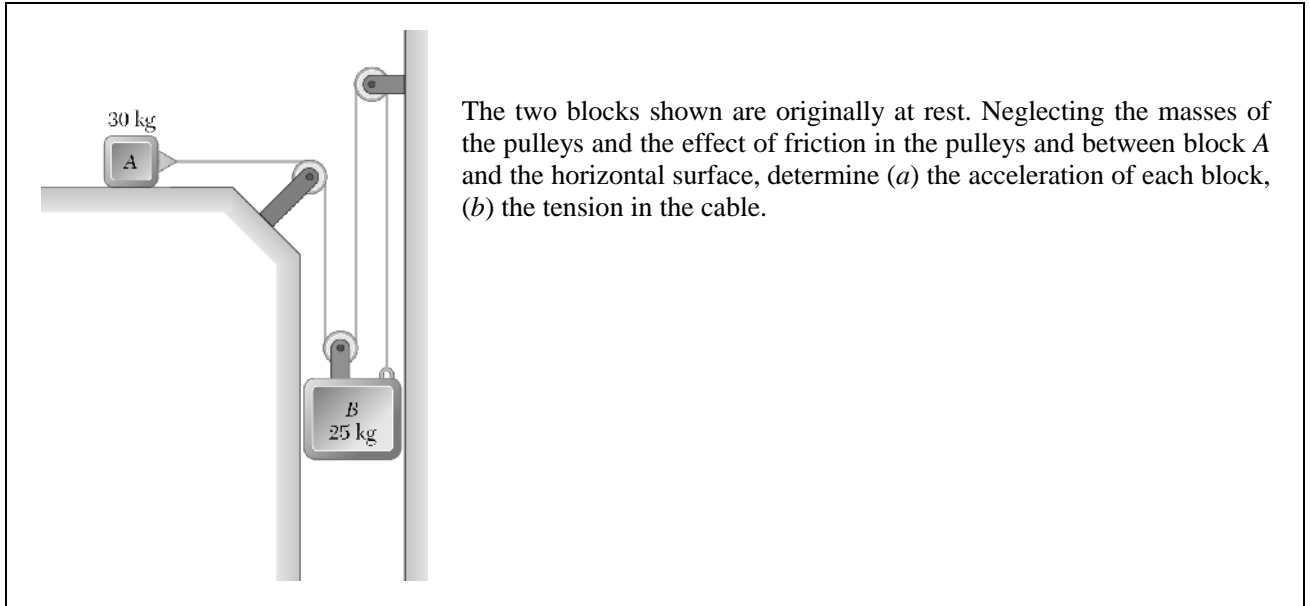
A spring scale *A* and a lever scale *B* having equal lever arms are fastened to the roof of an elevator, and identical packages are attached to the scales as shown. Knowing that when the elevator moves downward with an acceleration of 4 ft/s^2 the spring scale indicates a load of 14.1 lb, determine (a) the weight of the packages, (b) the load indicated by the spring scale and the mass needed to balance the lever scale when the elevator moves upward with an acceleration of 4 ft/s^2 .

Chapter 12, Problem 9



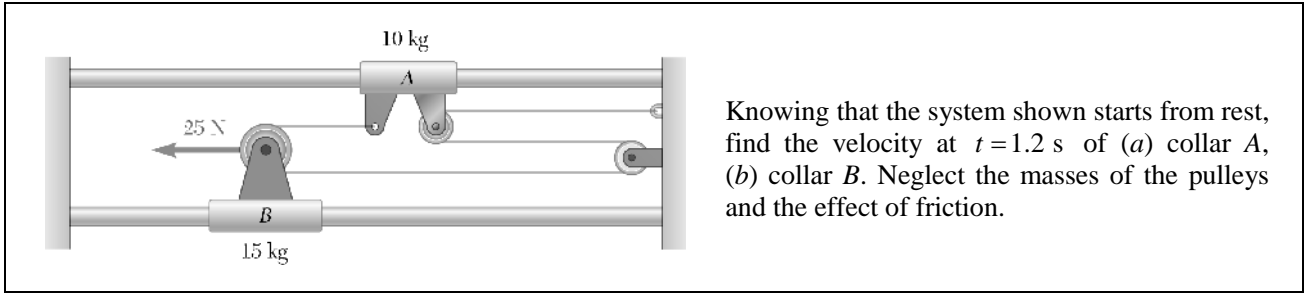
A 20-kg package is at rest on an incline when a force \mathbf{P} is applied to it. Determine the magnitude of \mathbf{P} if 10 s is required for the package to travel 5 m up the incline. The static and kinetic coefficients of friction between the package and the incline are both equal to 0.3.

Chapter 12, Problem 11



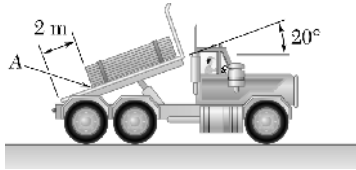
The two blocks shown are originally at rest. Neglecting the masses of the pulleys and the effect of friction in the pulleys and between block *A* and the horizontal surface, determine (a) the acceleration of each block, (b) the tension in the cable.

Chapter 12, Problem 18



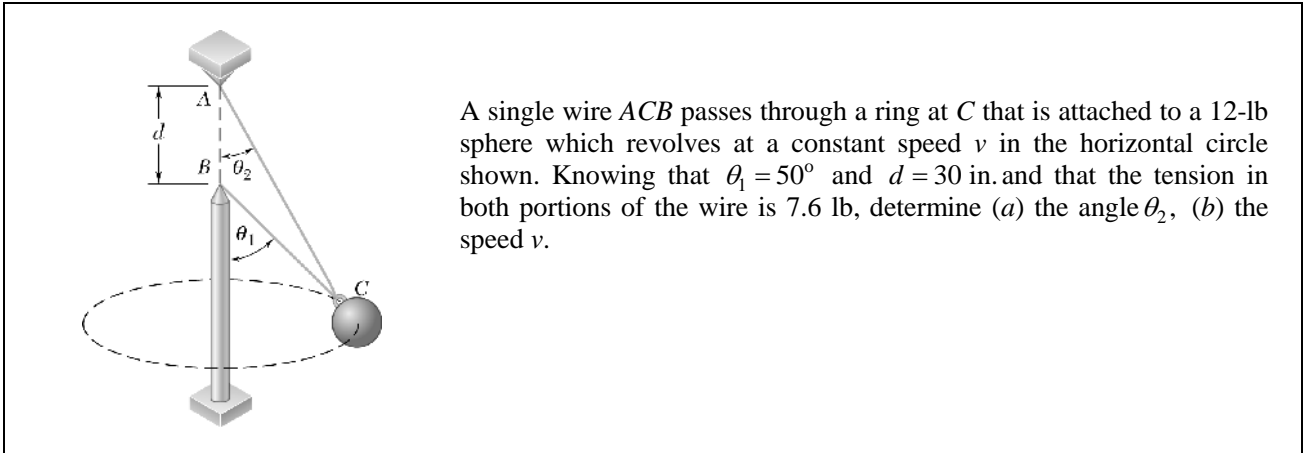
Knowing that the system shown starts from rest, find the velocity at $t = 1.2$ s of (a) collar A, (b) collar B. Neglect the masses of the pulleys and the effect of friction.

Chapter 12, Problem 23



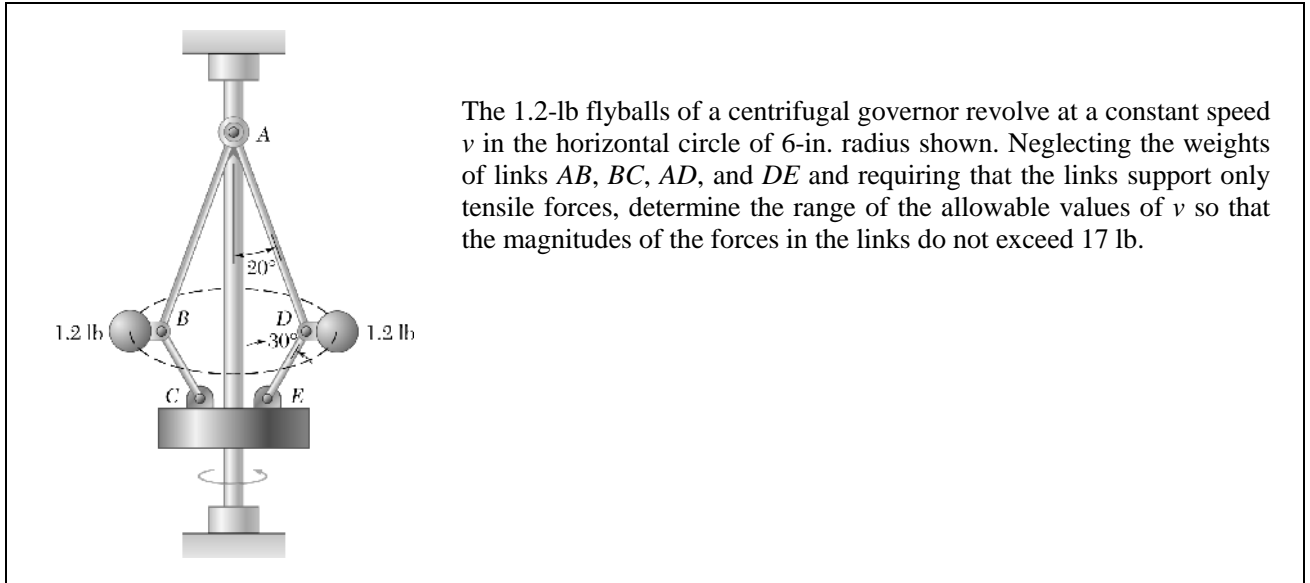
To unload a bound stack of plywood from a truck, the driver first tilts the bed of the truck and then accelerates from rest. Knowing that the coefficients of friction between the bottom sheet of plywood and the bed are $\mu_s = 0.40$ and $\mu_k = 0.30$, determine (a) the smallest acceleration of the truck which will cause the stack of plywood to slide, (b) the acceleration of the truck which causes corner *A* of the stack to reach the end of the bed in 0.9 s.

Chapter 12, Problem 39



A single wire ACB passes through a ring at C that is attached to a 12-lb sphere which revolves at a constant speed v in the horizontal circle shown. Knowing that $\theta_1 = 50^\circ$ and $d = 30$ in. and that the tension in both portions of the wire is 7.6 lb, determine (a) the angle θ_2 , (b) the speed v .

Chapter 12, Problem 43*



The 1.2-lb flyballs of a centrifugal governor revolve at a constant speed v in the horizontal circle of 6-in. radius shown. Neglecting the weights of links AB , BC , AD , and DE and requiring that the links support only tensile forces, determine the range of the allowable values of v so that the magnitudes of the forces in the links do not exceed 17 lb.