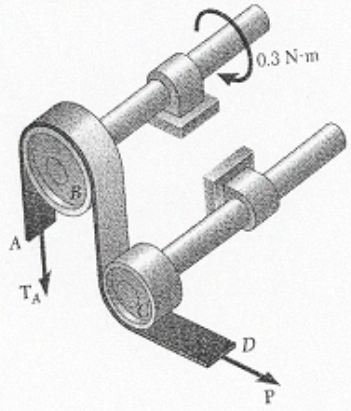
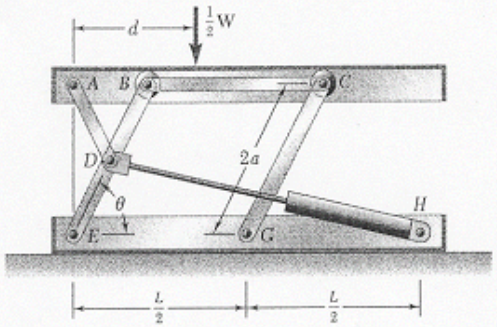
1. a.) A recording tape passes over the 20-mm-radius drive drum B and under the idler drum C. Knowing that the coefficients of friction between the tape and drums are $\mu s=0.40$ (coefficient of static friction) and $\mu k=0.30$ (coefficient of kinetic friction) and that drum C is free to rotate, determine the smallest allowable value of P if slipping of the tape on drum B is not to occur.

   b.) If the idler drum C is frozen and cannot rotate, determine the smallest allowable value of P if slipping of the tape on drum B is not to occur.

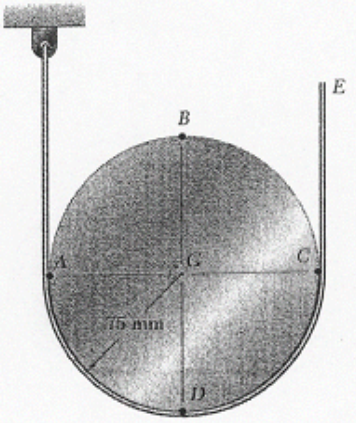


2. A hydraulic lift table is used to raise a 1000-kg crate. It consists of a platform and two identical linkages on which hydraulic cylinder exert equal forces. (Only one linkage and one cylinder are shown.) Members EDB and CG are each of length 2a, and member AD is pinned to the midpoint of EDB. If the crate is placed on the table, so that half of its weight is supported by the system shown, determine the force exerted by each cylinder in raising the crate for $\theta=60$, a = 0.70 m, and L =3.20 m. Show that the result obtained is independent of the distance d.



Ph. D. Qualified Examine Dynamics **Apr. 2002**

1. The motion of the 75mm radius cylinder is controlled by the cord shown. Knowing that end E of the cord has a velocity of 300 mm/s and an acceleration of 480 mm/s^2, both directed upward, determine the accelerations of points A, B C, and D. (25 %)



2. A uniform rod of length L and mass m is supported as shown. If the cable attached at end B suddenly breaks, determine (a) the acceleration of end B, (b) the reaction at the pin support. (25 %) $\bar{I} = \frac{1}{12} mL^2$