**PROBLEM 15.81**

A 3 in.-radius drum is rigidly attached to a 5-in.-radius drum as shown. One of the drums rolls without sliding on the surface shown, and a cord is wound around the other drum. Knowing that end $E$ of the cord is pulled to the left with a velocity of 6 in./s, determine (a) the angular velocity of the drums, (b) the velocity of the center of the drums, (c) the length of cord wound or unwound per second.

![Diagram of drums and cord](image)

**PROBLEM 15.86**

Knowing that at the instant shown the angular velocity of rod $BE$ is 4 rad/s counterclockwise, determine (a) the angular velocity of rod $AD$, (b) the velocity of collar $D$, (c) the velocity of Point $A$.

![Diagram of rod and collar](image)

**PROBLEM 15.111**

An automobile travels to the left at a constant speed of 48 mi/h. Knowing that the diameter of the wheel is 22 in., determine the acceleration (a) of Point $B$, (b) of Point $C$, (c) of Point $D$.

![Diagram of automobile](image)

**PROBLEM 15.141**

Rod $AB$ moves over a small wheel at $C$ while end $A$ moves to the right with a constant velocity $v_A$. Using the method of Section 15.9, derive expressions for the angular velocity and angular acceleration of the rod.

![Diagram of rod and wheel](image)