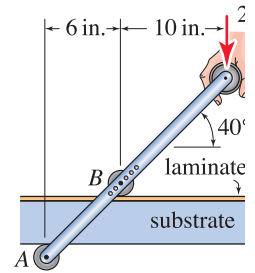
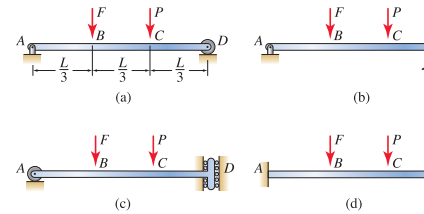


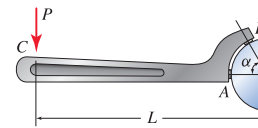
The tool shown is used in a gluing operation to press a thin laminate to a thicker substrate. If the wheels at points  $A$  and  $B$  both have 2 in. diameter and have frictionless bearings, and a 20 lb vertical force is applied to the handle of the tool, determine the forces applied to the top of the laminate and the bottom of the substrate.



A variety of structures with pin, roller, and built-in supports are shown. In Figs. P5.10(c) and P5.11(c), the rollers at point  $D$  allow vertical translation and constrain horizontal translation and rotation. Determine all reactions. Express your answers in terms of parameters such as  $L$ ,  $F$ ,  $P$ , and/or  $M$ .



A spanner wrench is used to apply torque to circular shafts and other similar shapes. Such wrenches are routinely used in the setup of tools such as milling machines, lathes, and so on. The wrench makes contact with the shaft at point  $A$ , which may be assumed to be frictionless, and at  $B$  where a small pin fits into a hole in the shaft. If  $P = 80$  N,  $L = 120$  mm,  $r = 25$  mm, and  $\alpha = 120^\circ$ , determine the reactions at points  $A$  and  $B$ .



In the structure shown, member  $ABCD$  is supported by a pin at  $C$  and a cable that wraps around pulley  $E$  which is frictionless.

- Specify if member  $ABCD$  has complete fixity or partial fixity and whether it is statically determinate or statically indeterminate.
- Draw the FBD for member  $ABCD$ , and determine the cable tension in terms of force  $F$  and length  $L$ . Comment on any difficulties that might arise in your analysis.

