**PROBLEM 6.129**

The Whitworth mechanism shown is used to produce a quick-return motion of Point $D$. The block at $B$ is pinned to the crank $AB$ and is free to slide in a slot cut in member $CD$. Determine the couple $M$ that must be applied to the crank $AB$ to hold the mechanism in equilibrium when $(a) \alpha = 0$, $(b) \alpha = 30^\circ$.

![Mechanism Diagram]

**PROBLEM 6.141**

The tongs shown are used to apply a total upward force of 45 kN on a pipe cap. Determine the forces exerted at $D$ and $F$ on tong $ADF$.

![Tongs Diagram]

**PROBLEM 6.145**

Determine the magnitude of the gripping forces produced when two 300-N forces are applied as shown.

![Gripping Forces Diagram]