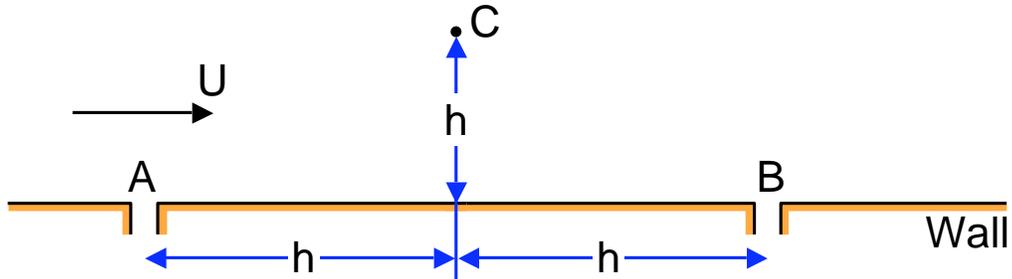


**Problem 120F**

Consider the planar, irrotational flow of an incompressible, inviscid fluid (density,  $\rho$ ) shown in the sketch.



It consists of a uniform stream of velocity,  $U$ , parallel to a wall. This is modified by the continuous removal of fluid at a location,  $C$ , which is a distance,  $h$ , from the wall (could be a water quality sampling device). The volume rate of removal of fluid is  $Q$  per unit distance perpendicular to the sketch. This volume rate of removal is to be evaluated by measuring the difference in the pressure at the points  $A$  and  $B$  on the wall where  $A$  and  $B$  are as shown in the sketch. Find the necessary relation between  $Q$ ,  $h$ ,  $\rho$  and  $U$  and the pressure difference,  $(p_A - p_B)$ .