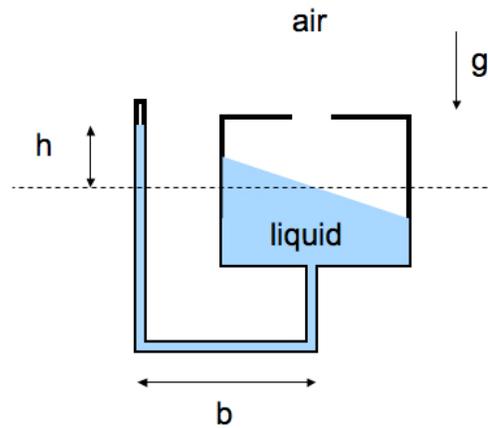


MIT Department of Mechanical Engineering  
2.25 Advanced Fluid Mechanics

**Problem 1.13**

This problem is from “Advanced Fluid Mechanics Problems” by A.H. Shapiro and A.A. Sonin

*Accelerometer*



It is proposed to use the type of system shown in the sketch as an accelerometer for measuring the horizontal acceleration,  $a_x$ , and to obtain  $a_x$  from the formula

$$a_x = \frac{h}{b}g, \quad (1.13a)$$

where  $g$  is the gravitational acceleration.

- (a) Derive the formula used for  $a_x$  and state all assumptions clearly. Why doesn't the mass density of the liquid appear in the formula.
- (b) Under what circumstances would this be a good method of determining  $a_x$ , and under what conditions could it be not so good? Suggest improvements in the device.

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