2.97 The open U-tube of Fig. P2.97 is partially filled with a liquid. When this device is accelerated with a horizontal acceleration, \( a \), a differential reading, \( h \), develops between the manometer legs which are spaced a distance \( l \) apart. Determine the relationship between \( a \), \( l \), and \( h \).

\[
\frac{dh}{dy} = -\frac{ay}{g+az} \quad \text{(Eq. 2.28)}
\]

Since,
\[
\frac{dh}{dy} = -\frac{h}{l}
\]
and \( az = 0 \),

then
\[
-\frac{h}{l} = -\frac{a}{g+0}
\]
or
\[
h = \frac{al}{g}
\]