Consider an ideal gas. What happens with the slope of an isentroop in a uv-diagram (v on the horizontal axis) if the volume goes to infinity?

The slope of an isentroop in a uv-diagram (v on the horizontal axis) is given by: $\left(\frac{\partial u}{\partial v}\right)_s$. From $du = TdS - Pdv$ it follows that this is equal to -P. If the volume of an ideal gas goes to infinity the pressure goes to zero. Therefore the slope of the isentroop goes to zero (i.i. it becomes a horizontal line).