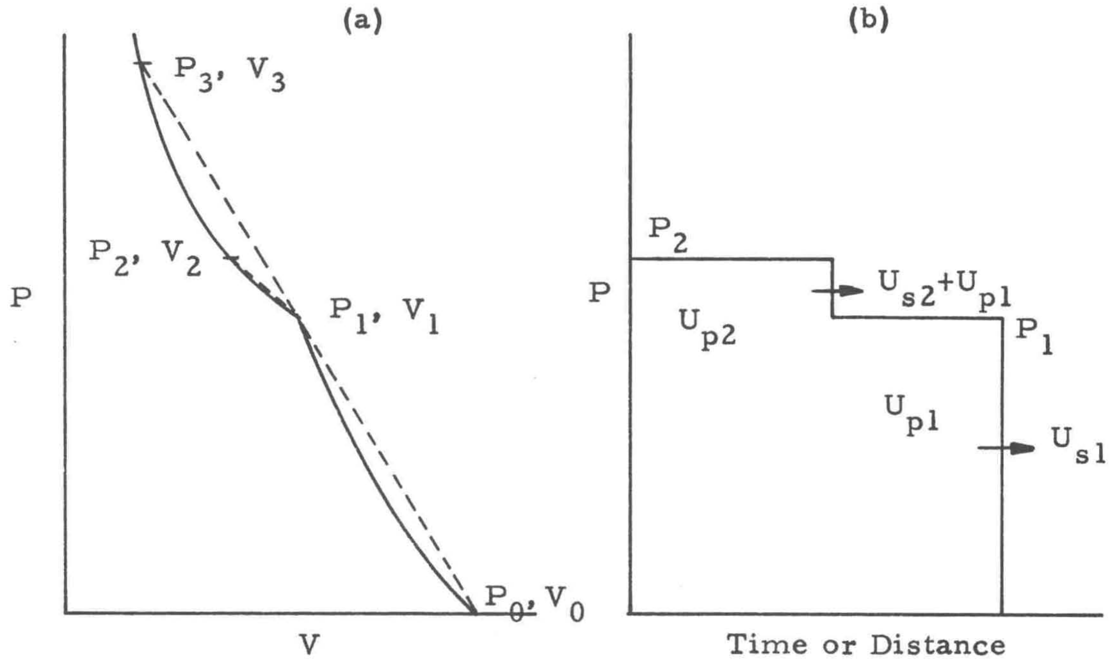

Fig. 2 P-V diagram for a material that undergoes a phase transition and the resulting pressure profile.

of pressure and volume in the form

$$U_s = V_0\sqrt{\frac{P-P_0}{V_0-V_1}} = V_0\sqrt{-\frac{\Delta P}{\Delta V}}\ .$$

The shock velocity is then proportional to the square root of the slope of line ($-\Delta P/\Delta V$), called the Rayleigh line, which connects the initial and final states. When going to the state P_2, V_2 from the initial state, the slope of the line joining them is less than the slope of the ray connecting the original state to P_1, V_1. Thus, the velocity of the shock wave has decreased with pressure constituting an unstable condition. In this circumstance, two stable shock waves are formed; the first has the characteristics of the onset of the transition at P_1, V_1 and the second is associated with going from the state P_1, V_1 to P_2, V_2. The shock wave that accompanies the transition travels faster than the second wave and as a result separation between these two waves increases in time and space when traversing