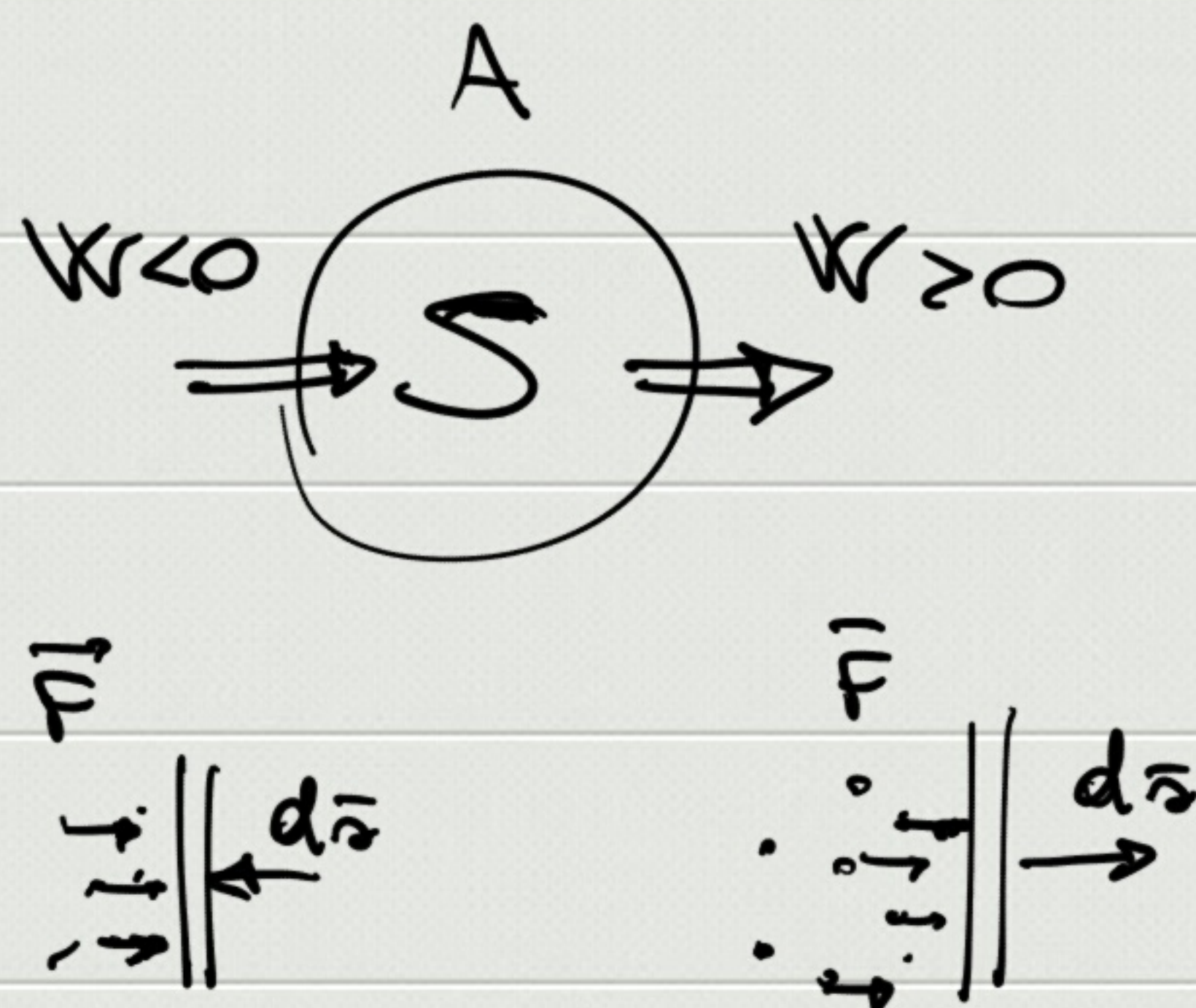
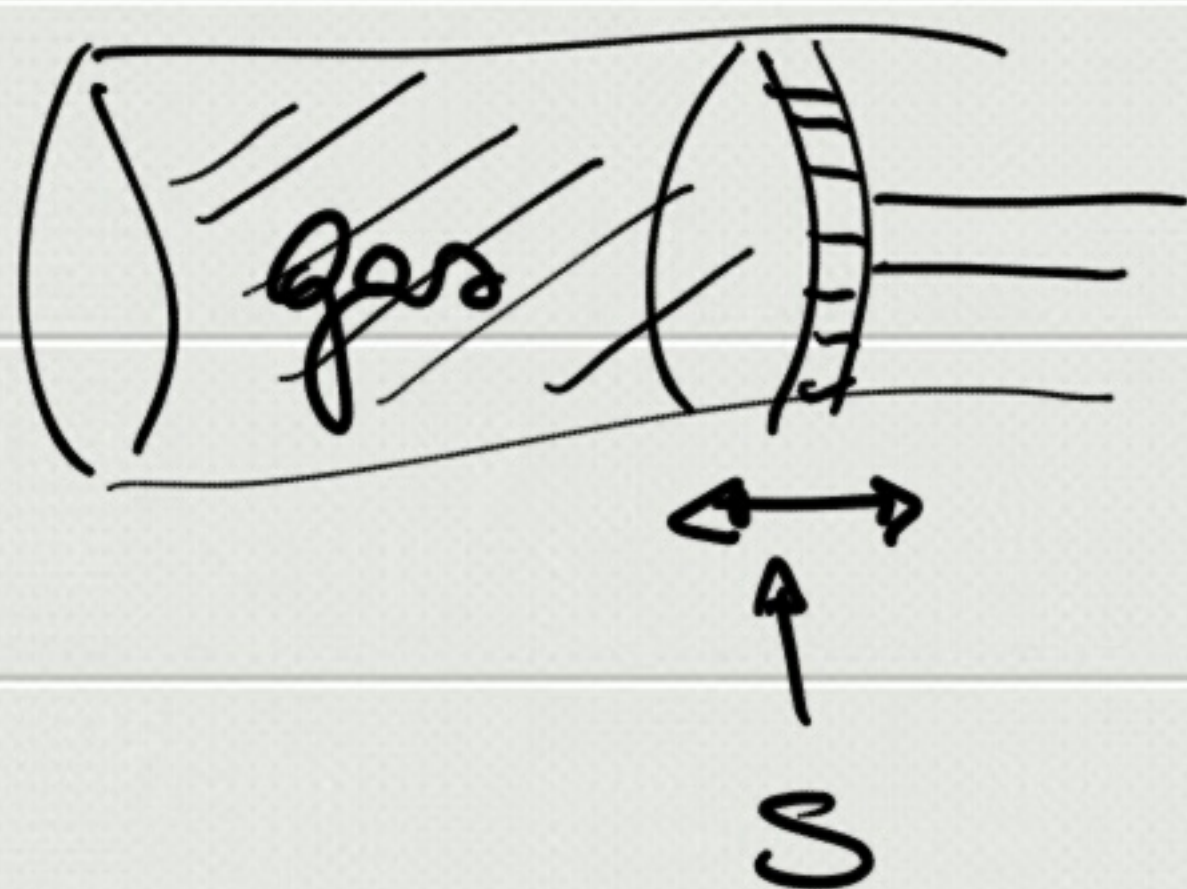


$$dW = \bar{F} d\bar{s}$$

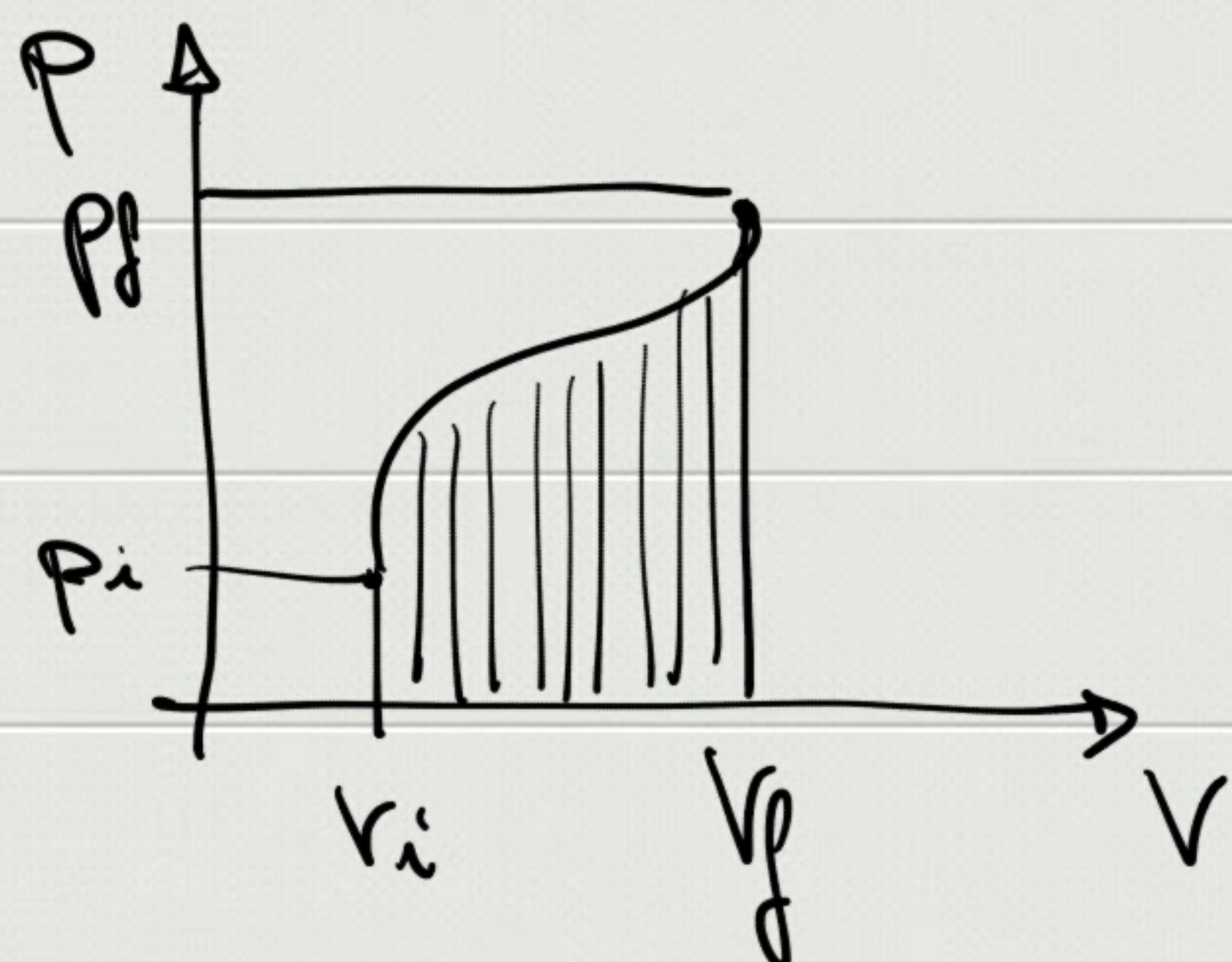


$$\delta W = \bar{F} d\bar{s} = p S ds = p dV$$

$$W_{i \rightarrow f} = \int_i^f p dV = \begin{cases} \text{caotico} \Rightarrow ? \\ \text{quasi statico} \Rightarrow \int_{v_i}^{v_f} p(v, \tau) dV \end{cases}$$

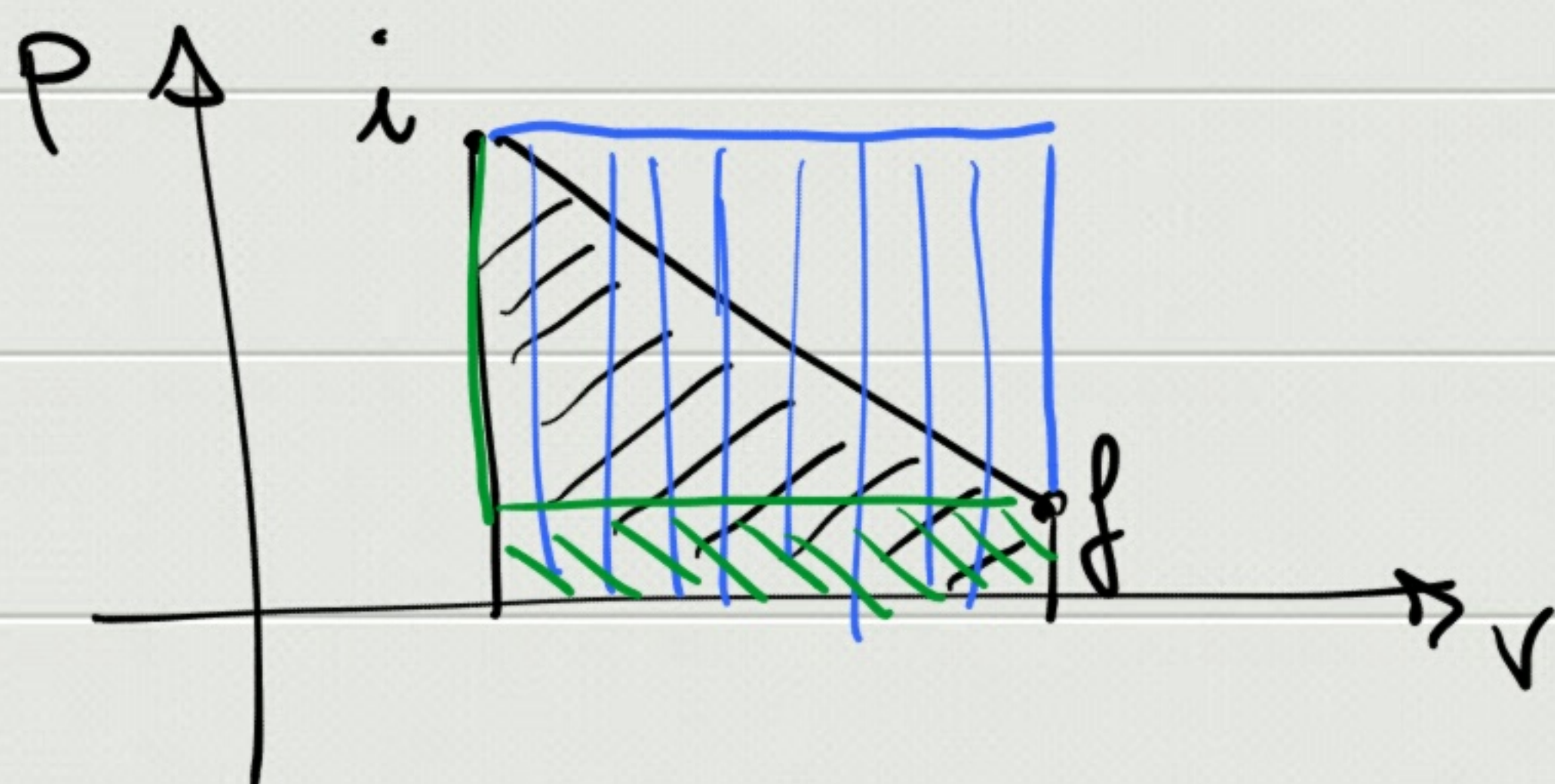
$$f(p, v, \tau) = 0 \Rightarrow p = p(v, \tau)$$





Clausius

$$W_{i \rightarrow f} = \int_{v_i}^{v_f} p \, dV$$



$$W_{i \rightarrow f} = \int_{v_i}^{v_f} p(v, \tau) \, dV \neq f(v_f) - f(v_i)$$

differentiale del lavoro non è "esatto"

$$\Rightarrow \boxed{\delta W}$$

$$\Rightarrow \boxed{\delta W = p \, dV}$$