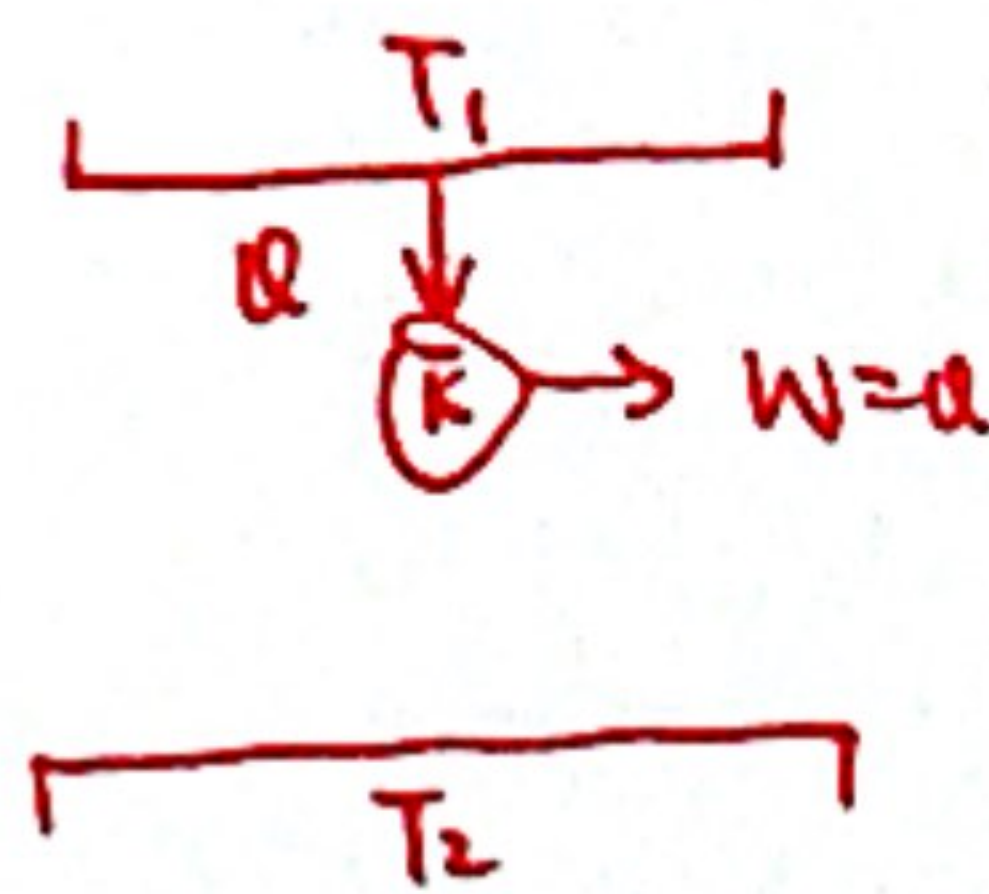


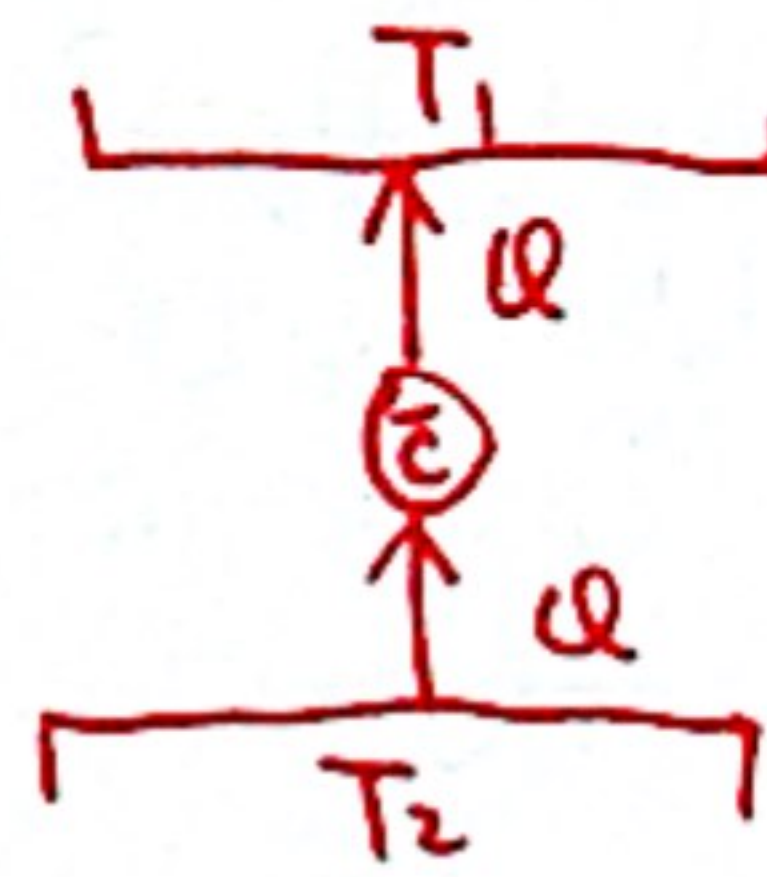
Equivalence of Clausius and Kelvin statements

Clausius: No process is possible whose sole effect is the transfer of heat from a colder to a hotter body.

Kelvin: No process is possible whose sole effect is to extract heat from a single reservoir and convert it into an equivalent amount of work.

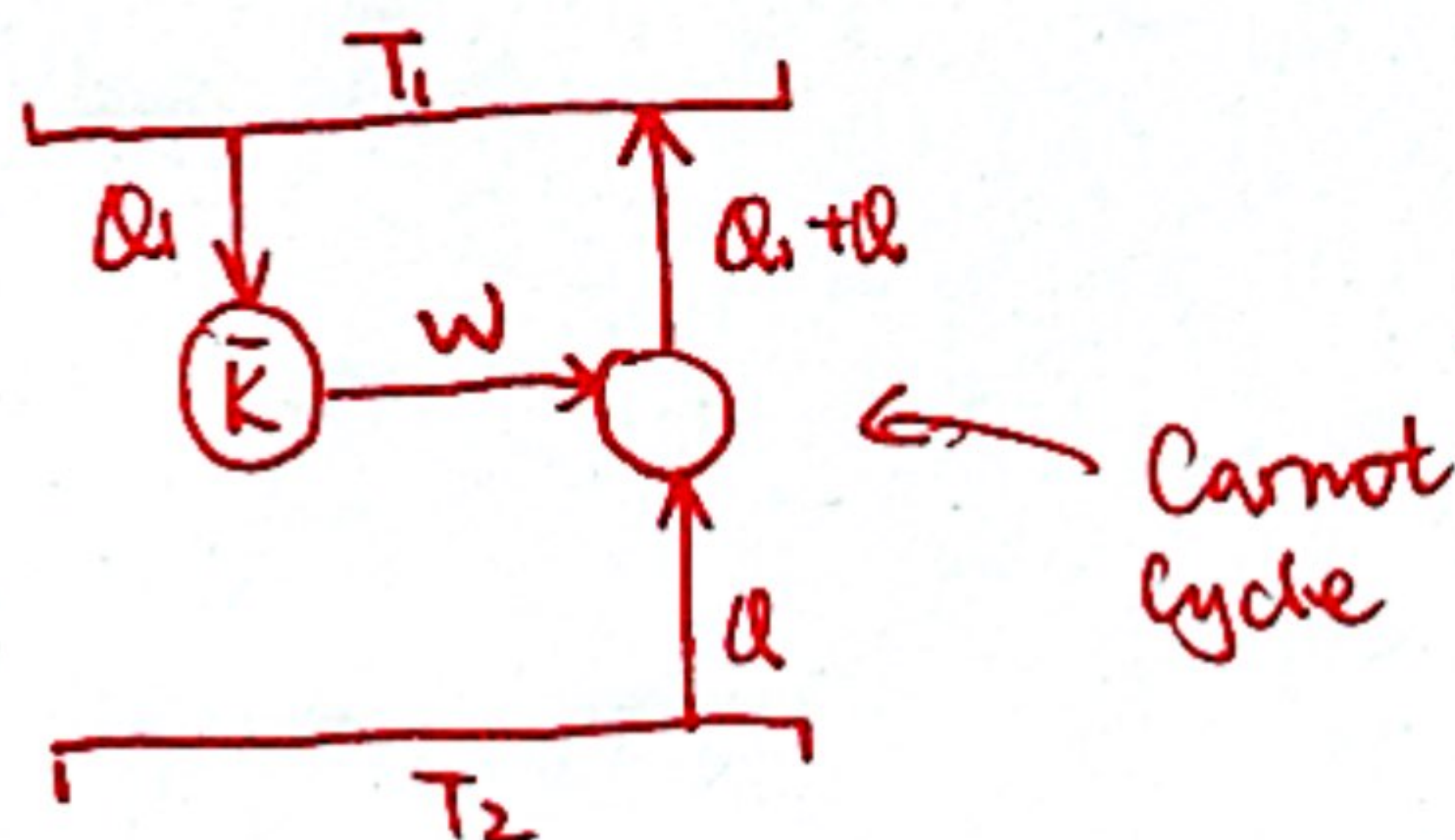


Forbidden by
Kelvin statement



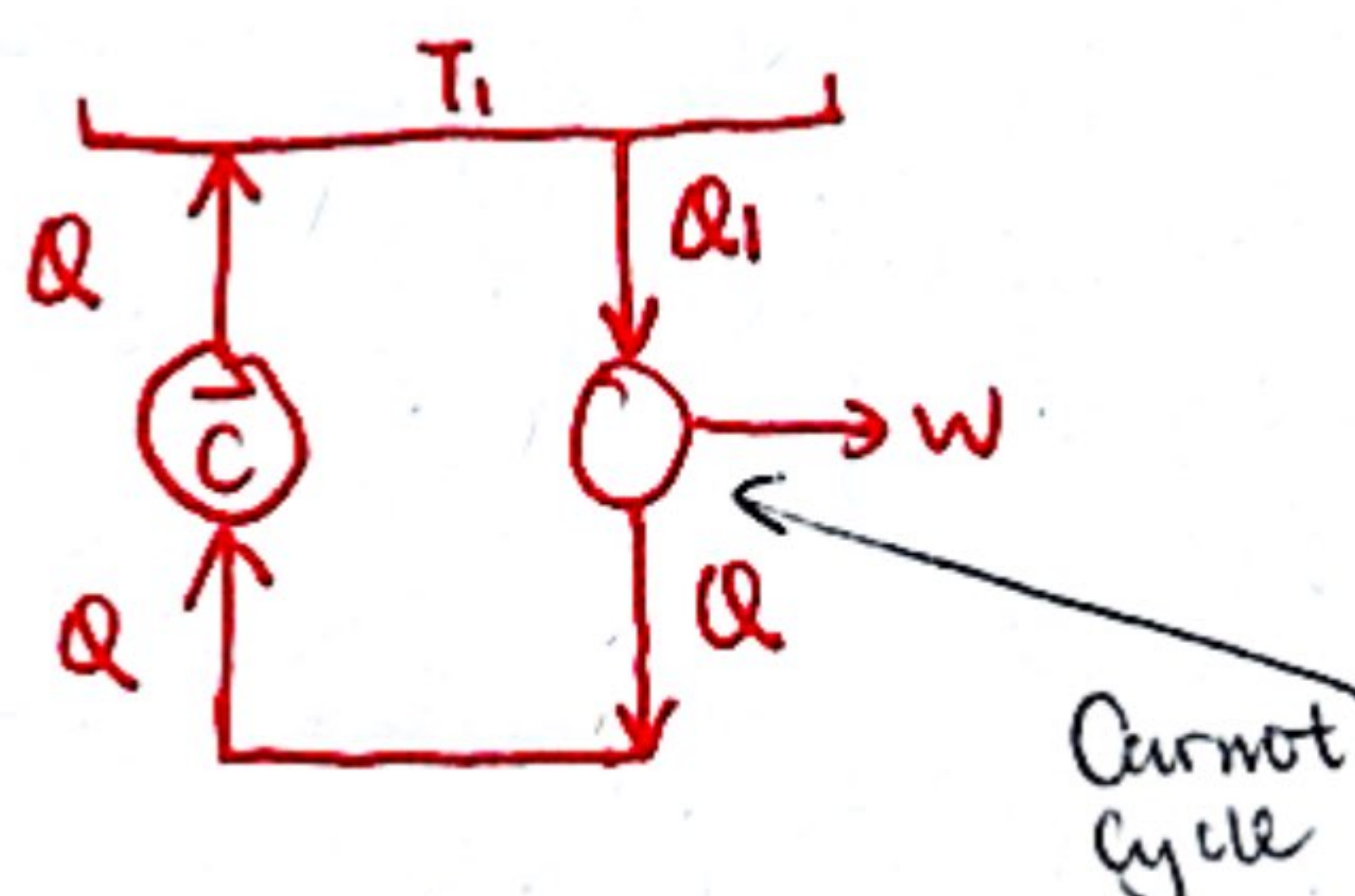
Forbidden by
Clausius statement.

Clausius to Kelvin



- Clausius states the net result is impossible. [$Q_1 = T_2 \rightarrow T_1$].
- Carnot cycle is possible.
- Engine \bar{K} must be impossible.

Kelvin to Clausius



- Kelvin states that the net result is impossible [$Q_1 = W$].
- Carnot cycle is possible
- Engine \bar{C} must be impossible.