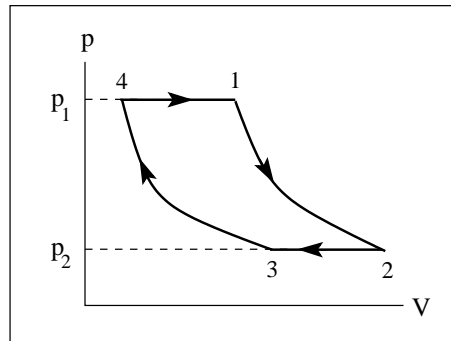


# Escher-Wyss gas turbine [tln75]

A gas flows in a closed system from the boiler via the turbine to the radiator and then via the compressor back into the boiler. As the beam of hot gas hits the blades of the turbine during the power stroke it expands with little heat transfer. The compression of the cooled gas is also roughly adiabatic. The gas is heated up inside the boiler and cooled down inside the radiator at different but roughly constant pressures.



## Idealized process (Joule cycle)

- 1-2: Adiabatic expansion of the hot gas after ejection from the boiler as it drives the turbine ( $S = \text{const}$ ).
- 2-3: Isobaric contraction as the gas flows through the radiator and cools down further in the process ( $p = \text{const}$ ).
- 3-4: Adiabatic compression of the cooled gas for injection into the boiler ( $S = \text{const}$ ).
- 4-1: Isobaric expansion of the gas as it heats up inside the boiler ( $p = \text{const}$ ).

Notes:

- The pressure inside the boiler is regulated by the rates of gas injection and ejection and the rate of heat transfer from the energy source to the gas.
- The injection and ejection rates are the same in mass units but the ejection rate is larger than the injection rate in volume units. This accounts for the expansion of the gas inside the boiler as described in step 4-1.