

Vapor Absorption Refrigeration

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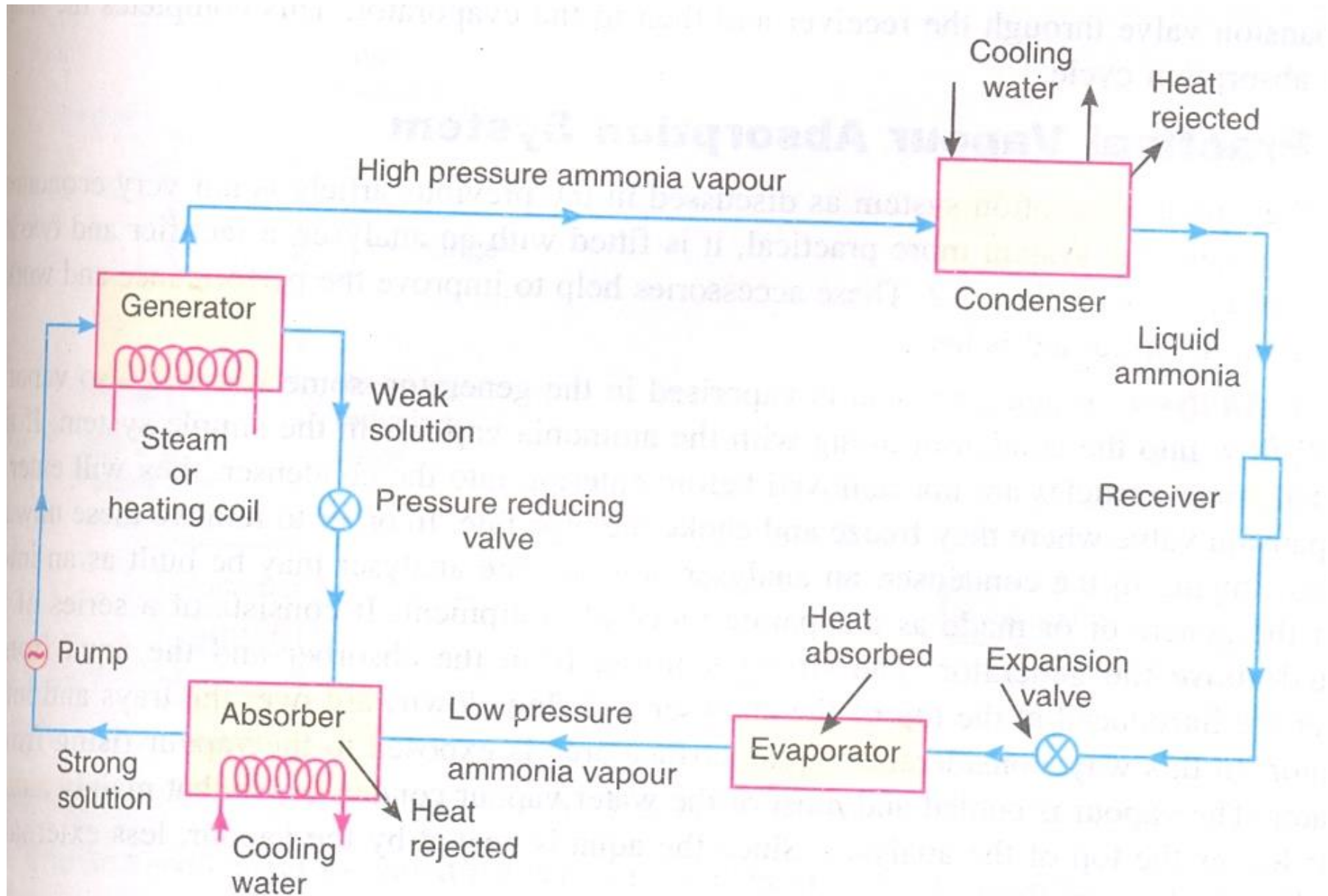
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2. Simple vapor Absorption refrigeration
3. Lithium Bromide
4. Electrolux Refrigeration

Simple vapor Absorption Refrigeration

- Evaporator
- Condenser
- Expansion Valve
- Absorber
- Generator

Vapor Compression Refrigeration

- Evaporator
- Condenser
- Expansion Valve
- Compressor



Parts of VAR Ideal cycle

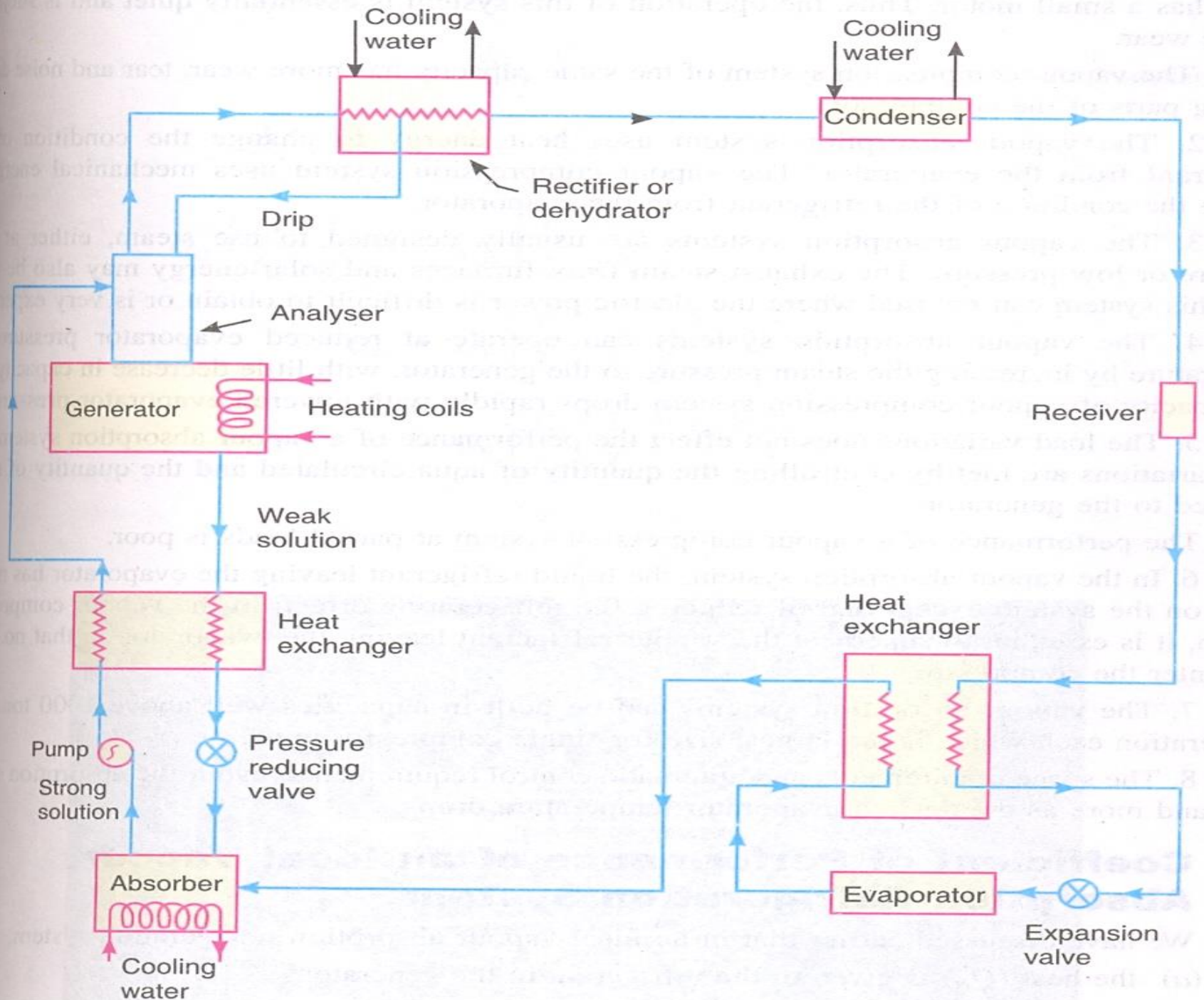
- Evaporator
- Absorber
- Generator
- Condenser
- Throttling valve

VAR over VCR (Advantages)

1. Less no Moving Parts, less Noise, and little wear and tear for same capacity
2. VAR uses low grade (Heat Energy) where as VCR uses High Grade (Mechanical Energy)
3. VAR suitable for the location where electric power is difficult to obtain very expensive
4. It works well with little decrease in capacity for low pressure and temperature of evaporator
5. VAR Part load efficiency is better than VCR
6. No requirement of super heating of the refrigerant leaving the evaporator
7. Large capacity Refrigeration VAR is better suitable than VCR

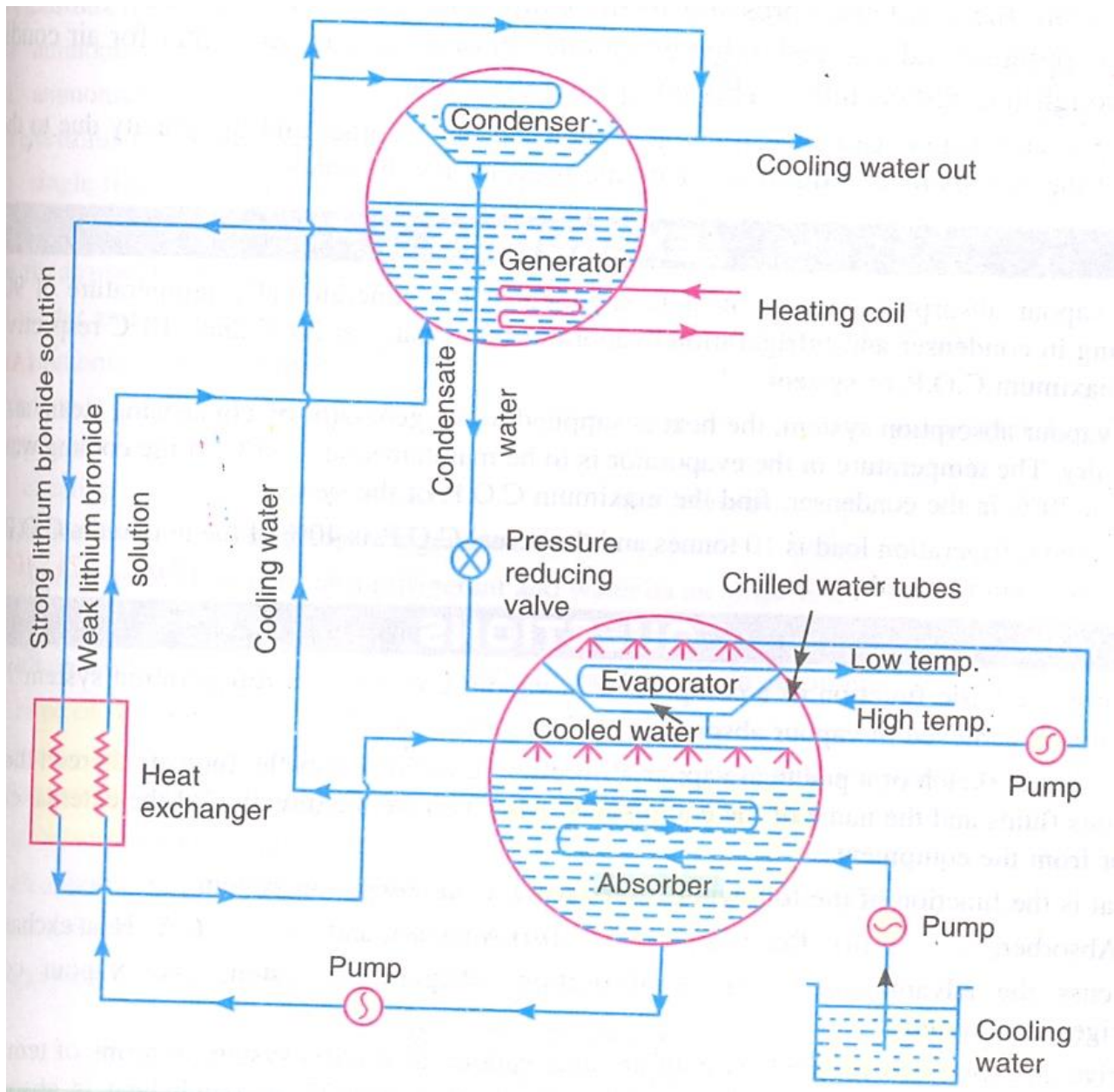
Disadvantages of VAR over VCR

1. COP is lower in VAR than VCR numerically
2. Small capacity VAR is Bulkier than VCR so VAR is better than VCR for large capacity



Parts of VAR Actual cycle

- Evaporator
 - Absorber
 - Generator
 - Condenser
 - Throttling valve
 - Analyser
 - Rectifier(Dehydrator)
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- Heat exchanger (One to sub-cool ammonia other to reduce temperature of weak solution)



Lithium Bromide Absorption Refrigeration system

- Evaporator + Absorber
- Condenser +generator
- Heat Exchanger
- Cooling water tank
- Water is used as a refrigerant therefore, the refrigeration temperature must be kept above the freezing point of water.

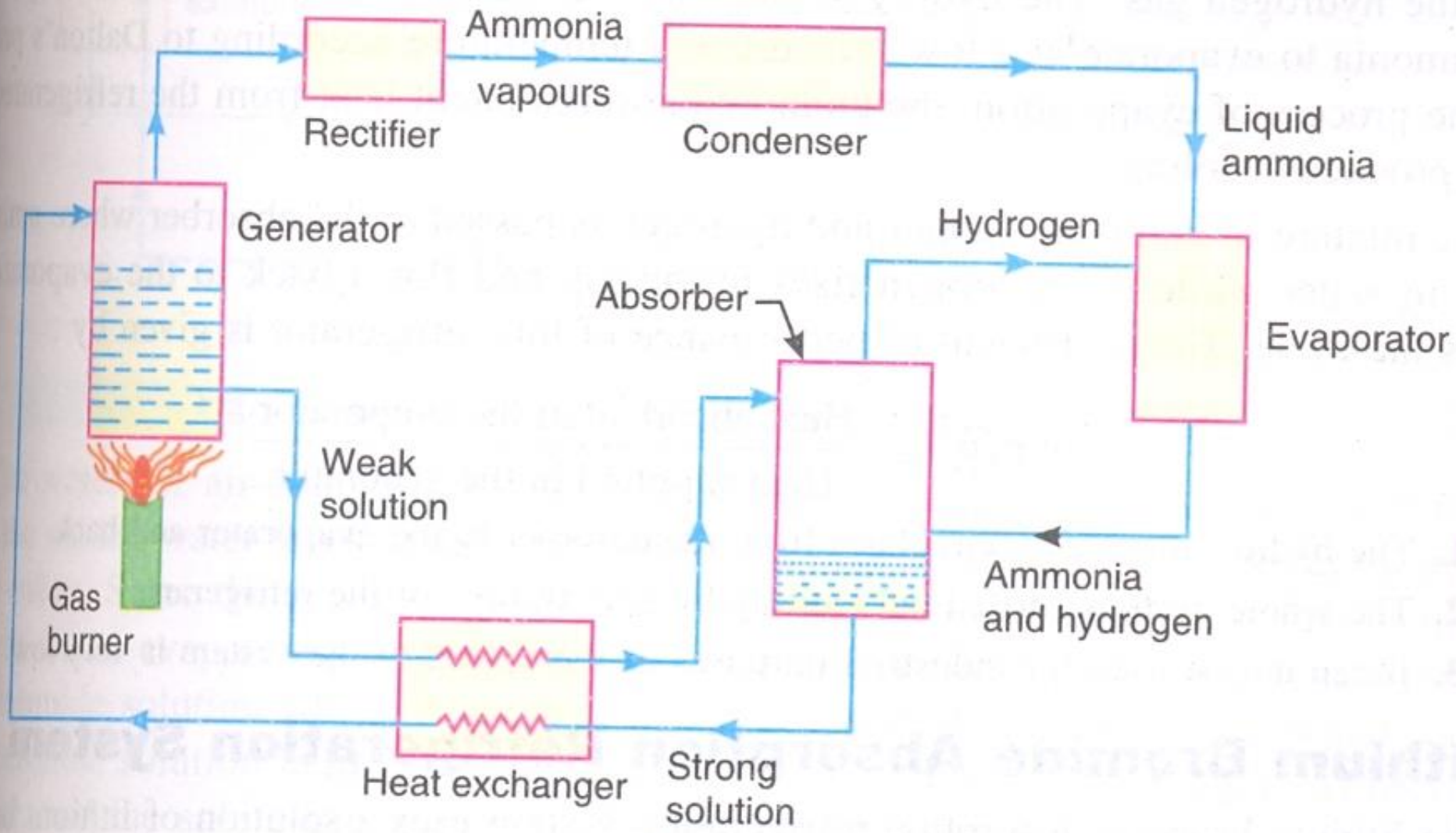


Fig. 7.3. Domestic electrolux type refrigerator.

Electrolux

- Carl Munters and Baltzer Von Platan in 1925
- Three fluid absorption system ($\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O}$)
- Eliminates the pump so that absence of moving parts
- Hydrogen used to increase the rate of evaporation non soluble in water
- Used in low pressure side of the system
- High pressure side of the system water ammonia is used
- Hydrogen gas only circulates from absorber to evaporator and back
- Whole cycle is carried out entirely by gravity flow of the refrigerant
- COP of the system is very low therefore it cannot be used for industrial purposes