

Adsorption Refrigeration

Orange Team B



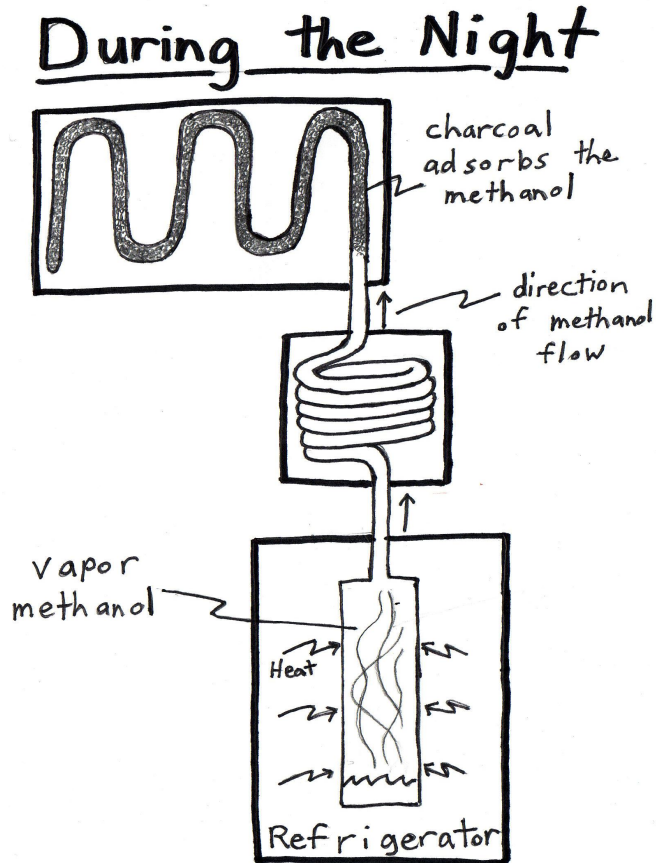
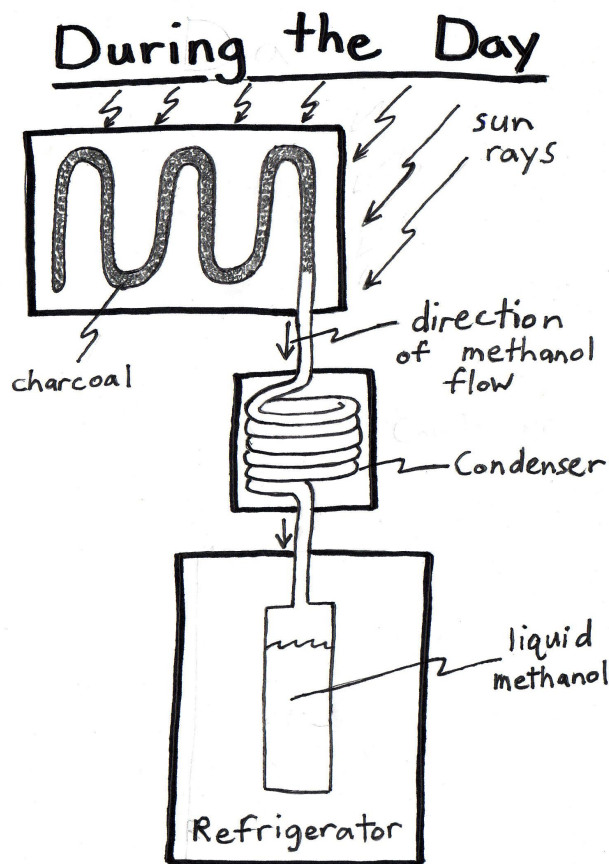
Customer Needs

Need	Attribute	Metric	Number
Spacious	Volume	Ft ³	5
Cold	Temperature	°F	33-40
Low cost	Money	\$	<100
Low maintenance	Time to maintenance	Years	5
Easy refuel	Time	Minutes	10-15
Safe	Health effects	Poisoning problems	0

Market

- 80% of world's population lives in developing countries. In 1996 only 33% of the refrigerators went to meet their refrigeration needs.
- 31% of food in developing countries is perishable (only 1/5th of which is refrigerated)
- NGOs spend millions of dollars on refrigeration projects (Montreal Protocol spent \$780 million)
- UNDP, UNEP, and IIR have great interest
- No significant competition

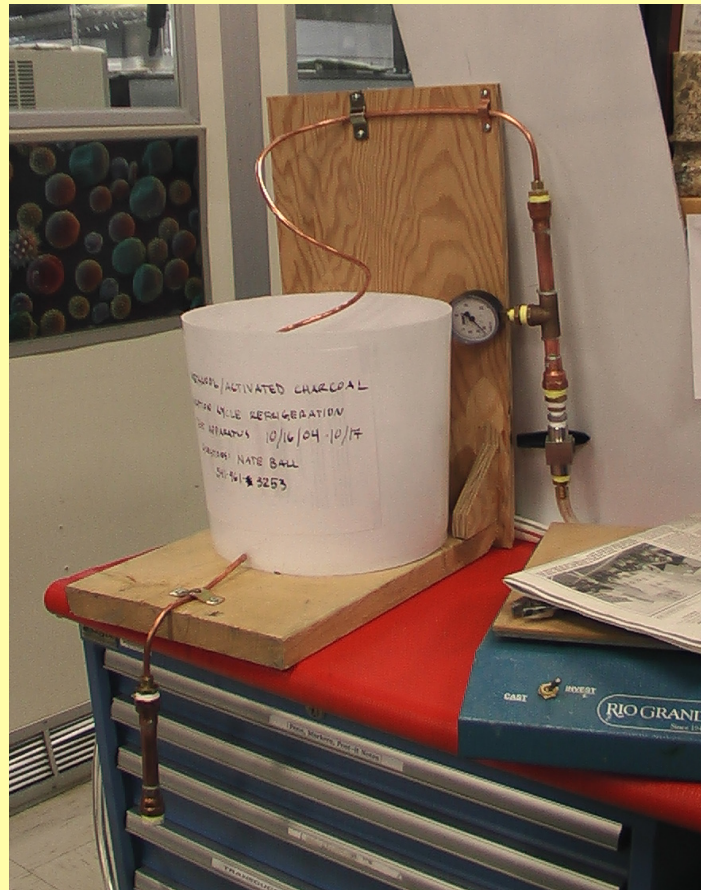
Adsorption Fridge Concept



Actual Product Appearance



Testing the Concept Feasibility



Critical Issues and Solutions

- methanol degeneration to formaldehyde within 12-18 months
 - flush the system once a year and replace methanol
 - formaldehyde oxidizes to water and carbon dioxide
 - disposal of formaldehyde relatively easy
- Not all the methanol adsorbs into the charcoal
 - seal the system better