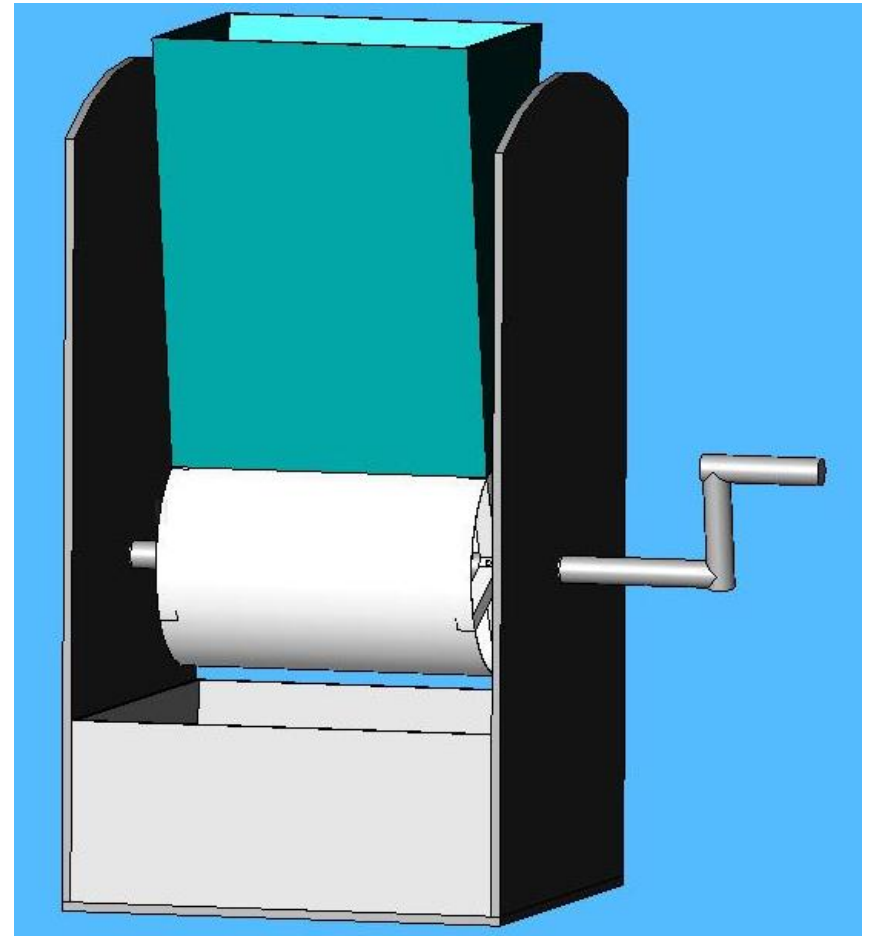


Problem #1:

- People in developing countries need a more efficient means for shredding manioc in order to make food and charcoal
- Current methods of shredding manioc are time-consuming by hand (20 minutes/lb)



Market

- **Customer Base:** 2 million farmers in 3rd world countries, where manioc is a staple of diet and charcoal an important fuel source
- **Target Cost:** \$50/machine
 - Total Market: 2 million x \$50/machine =
\$100 million market

Design Requirements

■ Hand Grater Test

- Optimum loading pressure: 1psi
- Lateral force to shred: .34lb

■ Our Design

- Assume contact area: $.75 \times 108 \text{in}^2 = 81 \text{in}^2$
 - Total lateral force to shred: $81 \times .34 = 27.54 \text{lb}$
-

Theoretical Production Rate

■ Bike Pedaling

- ❑ Assume 60rpm, after overcoming the 27.54lb linear force to shred
- ❑ Grates extend 1mm with complete contact on every revolution
- ❑ Load grates 6cm/min and 1 manioc ~ 6cm in diameter and ~2lbs
- ❑ Output = 2 manioc simultaneously/min = 4lbs/min

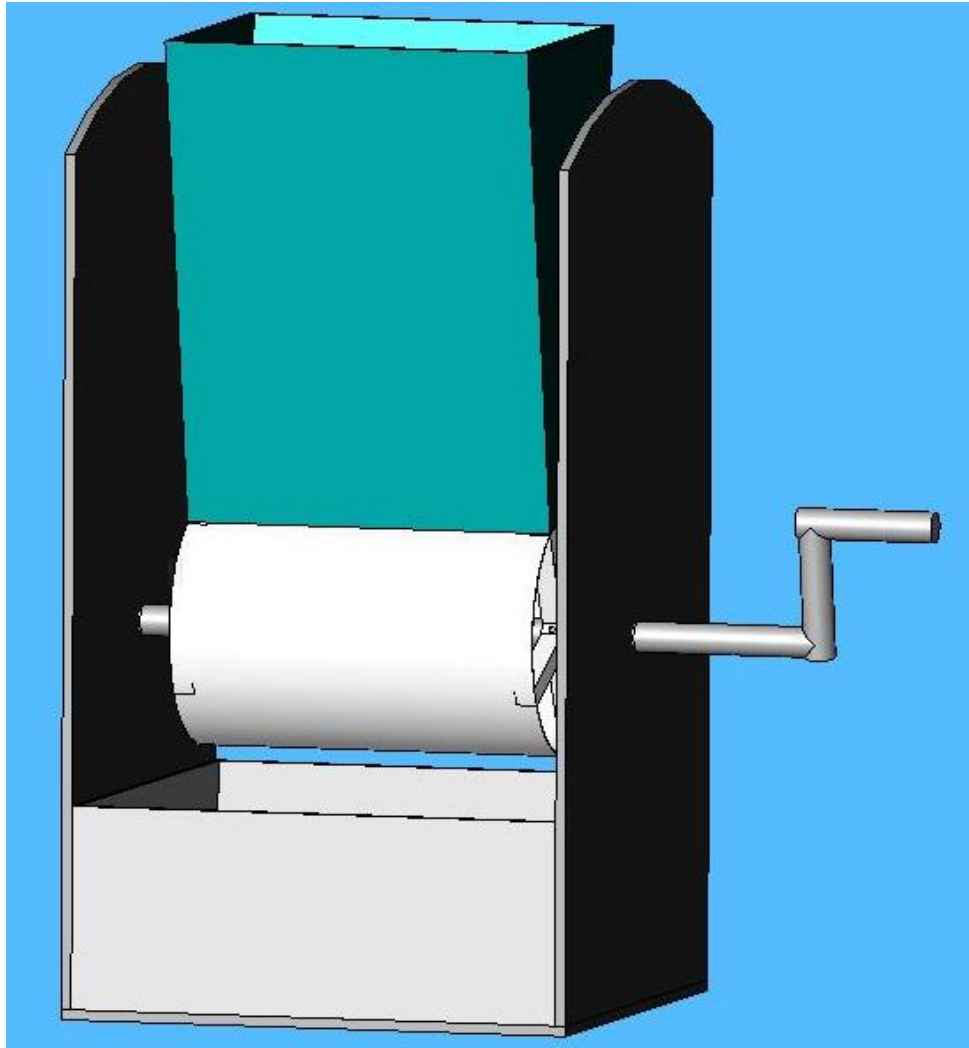
Implementation

- Manufacture and Sell Entire Product
 - Consumer would simply have to assemble on site
 - Manufacture Critical Components
 - Hopper, cylindrical grater, shaft, bearings, lock pins, standing bike, gears
 - Consumer manufactures base, supports, and collection bin via given specifications
-

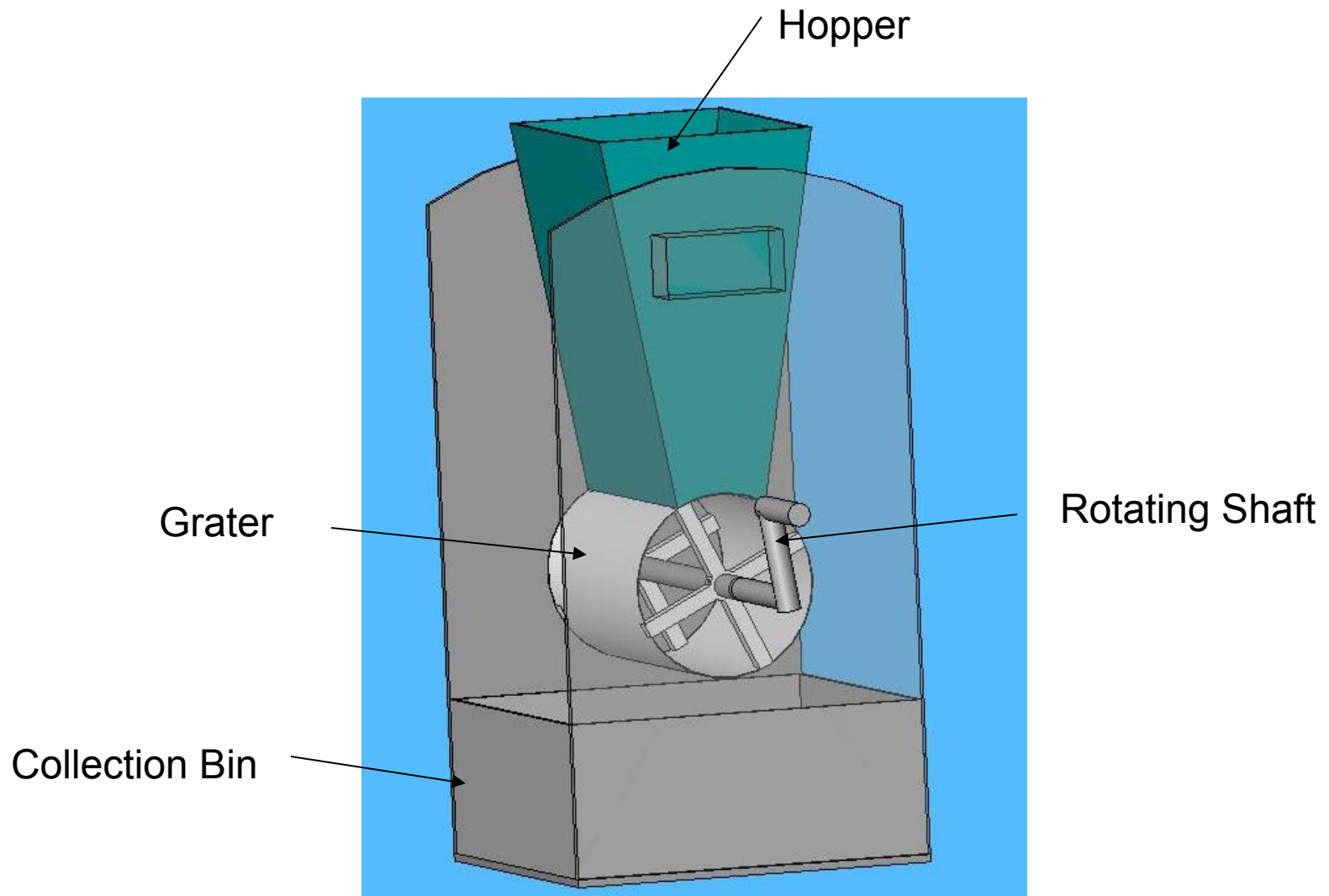
Benefits

- The proposed manioc grinder can reduce the grinding time from 20 minutes to 15 seconds
- This can be run by only one or two people, which would increase the consumers' s production by 80x
- Reduced cost for energy (charcoal is \$50/bag) for low income families (\$1000/year)

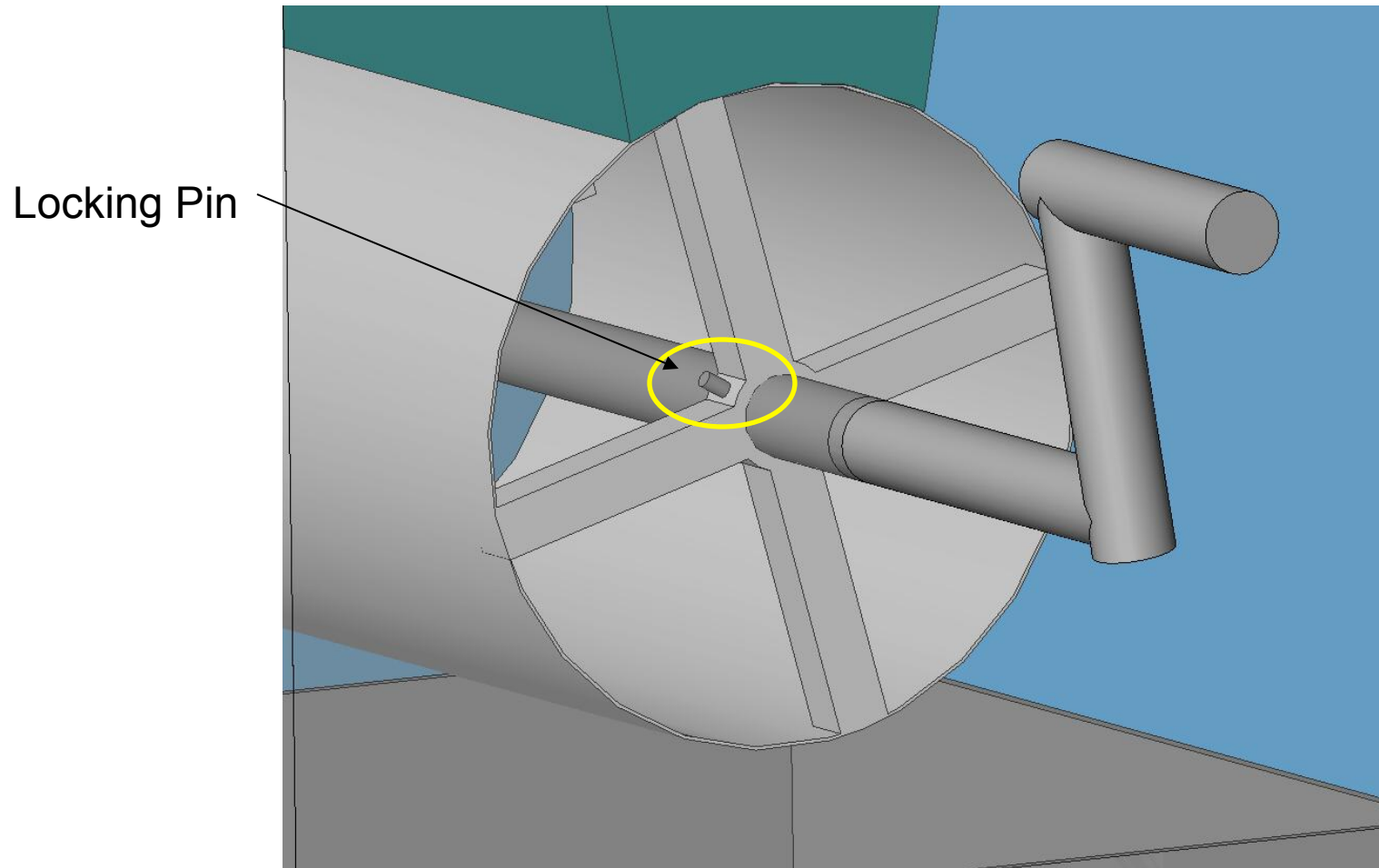
The Concept



Side View



Close Up of Grater



Disassembling Made Easy

