



# Dual Gear System

An augmented trike model for  
*His Wheels International*

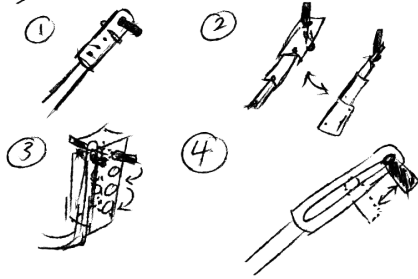
# The Problem

There are many people in developing countries with limited mobility of their lower body. *His Wheels International* pursues a mission to empower these individuals within their communities by providing hand powered trikes to assist the ease of daily life and promote their independence.

However, it is evident that the current design has potential for improvement to meet the existing needs. By prioritizing the end users and listening to their experiences, it was the goal of our team to innovate and design a prototype that would further improve the experience of its user.

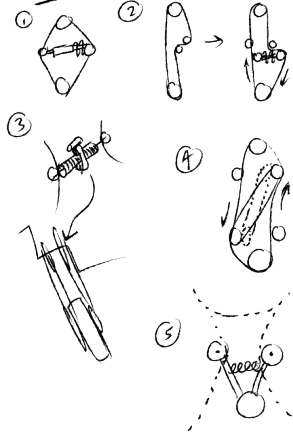
# Ideation

## Variable Handlebars



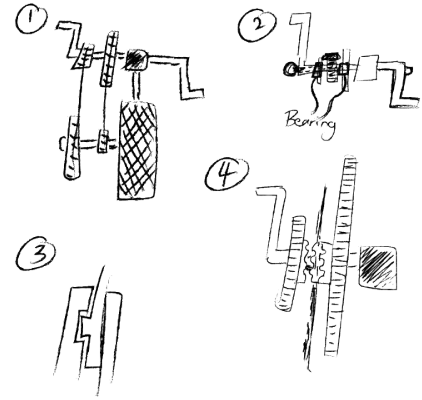
Initial sketches attempted to **improve ease of traversing inclines and rough terrain** by increasing the threshold of torque on the handlebars

## Tensioners



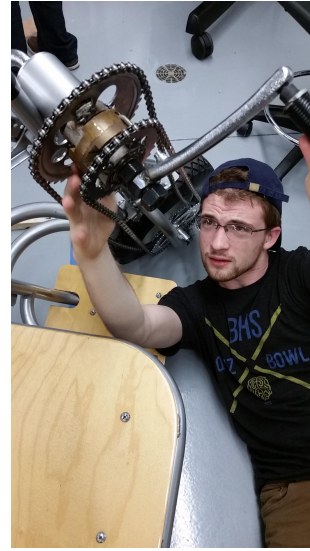
Subsequent concepts included the addition of a tensioning system for **adjustable chain lengths** while maintaining the ability to pedal forward and backward

## Gear Systems



Later designs implemented the use of a dual gear system for **variable gear ratios and simple function** for the user

# Production



In order to make a simple but functional prototype, a brass cylinder was custom-machined, and other materials were ordered and manipulated to fit our prototyping needs

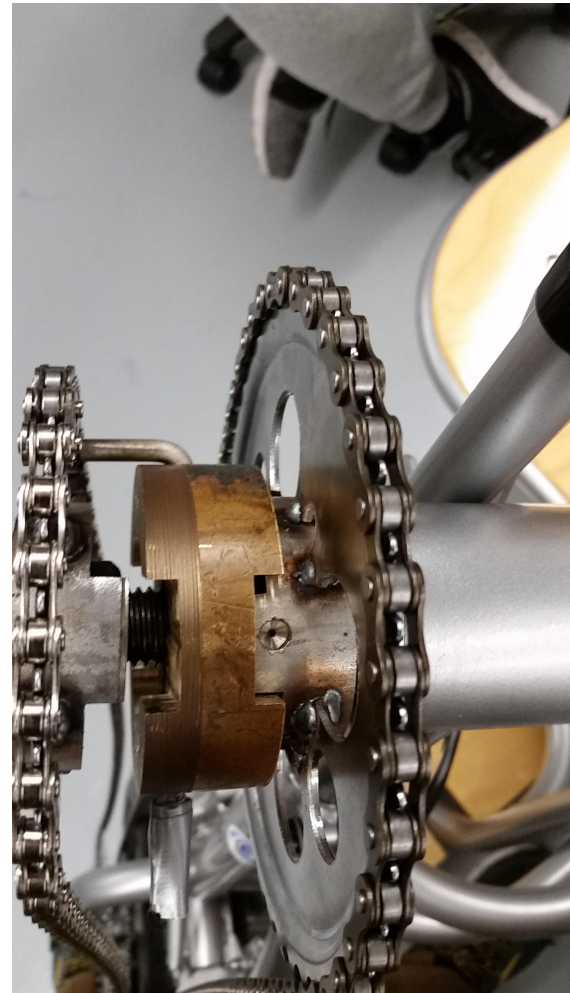
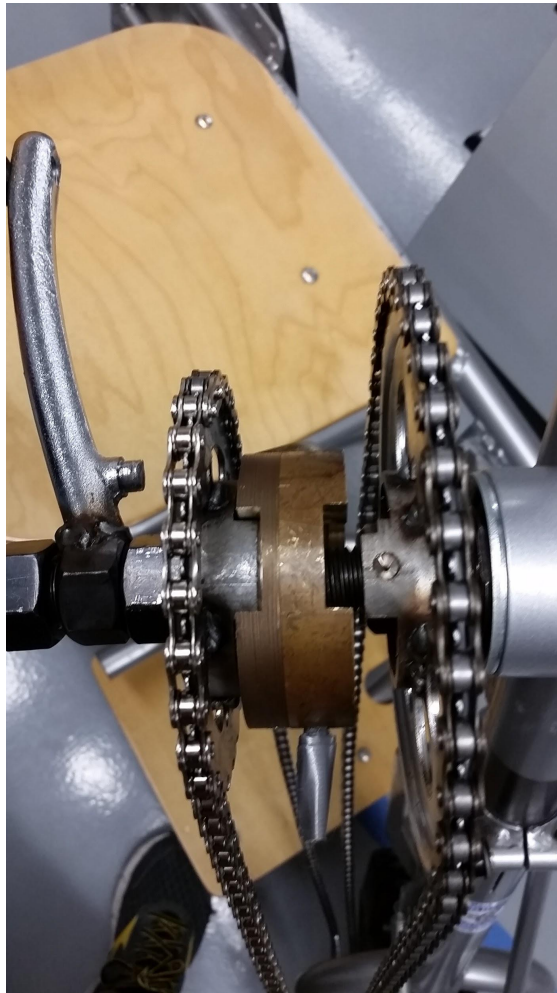
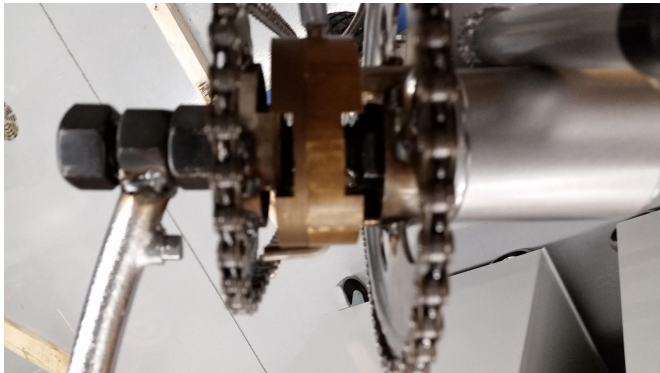




# Final Prototype

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Smaller sprocket allows for more torque; larger sprocket improves speed; intermediate position enables free wheeling



# Analysis

## *Benefits to dual gear system...*

- More robust than a tensioner system and consequently easier to construct and fix
- Provides more options for adjustability in the sprocket/gear ratios
- Incorporates a built-in spare chain for emergencies:
  - If the chain breaks in a single chain design, the user would be stranded and reliant on someone to come help, perpetuating a status of dependency
  - With two chains, the trike always has an extra chain in case one breaks or malfunctions, allowing the user to continue operating their only means of mobility without need of assistance

# Acknowledgements

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