

Modifying a Standard Pushrim Wheelchair to move with Bicep Flexion

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Introduction

Approximately one half of a percent of the American population outside of institutions are confined to using a wheelchair on a daily basis. Of these the vast majority use the standard tubular pushrim wheelchair for daily mobility, approximately 90%, who are called manual wheelchair users or MWU. A problem arises when a person must rely on using an on average thirty seven pound wheelchair to accomplish every day tasks instead of utilizing what humans have evolved to use for mobility, their feet. This problem is rapid muscle fatigue and inevitable long term muscle and joint problems.

Goal

The goal of this project was to alter the design of a standard pushrim wheelchair so that it requires less energy put forth by the operator than the current wheelchair design. This design will utilize a different method for propulsion of the chair than the current method of flexion of the triceps. This would allow greater mobility, decrease the prevalence of long-term joint and muscle problems, as well as increase the handicapped person's independence. Another aspect of the project was to design a mechanism which makes it easier for an operator to ascend steep hills and allows them to rest part way up the hill without descending.

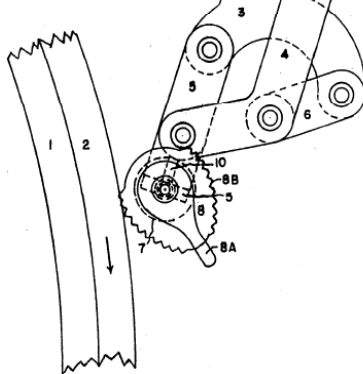
Design



Design Components

- Needle roller bearings
- Sprocket and drive chain assembly
- Herringbone gears

Anti-Roll Back



Anti-Roll Back Components

- Cam to stop the rollback
- Lever to engage the mechanism

This system replaces the current wheel lock in place on every manual wheelchair