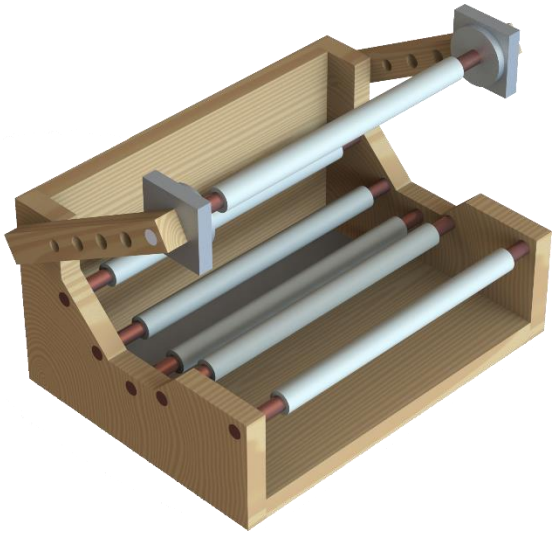
The Cradle: An Automated Fabric Roller for G & S Dye

The Problem

Currently, the fabric rolling process at G & S dye is arduous and time consuming. A large amount of the sole employee's time is spent on correcting imperfections while rolling (such as creases and wrinkles), and consumes time that could be spent on other store duties.



After analyzing the problem, we decided that to design a rolling device that:

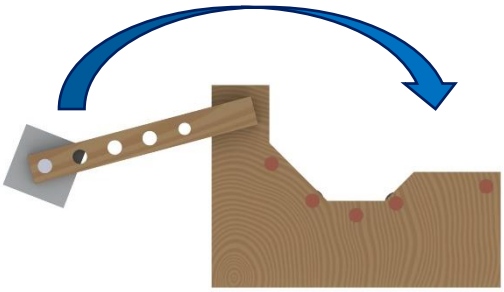
1. Automates the re-rolling process
2. Minimizes rolling errors and imperfections of the fabric roll
3. Accommodates a range of fabrics and fits inside the limited space of the fabric store

Our Solution

We designed The Cradle to simplify the rolling and rerolling process. The user loads the fabric by placing the roll into the "cradle" of rollers. For unrolling, the user simply pulls the fabric down the cutting table as the fabric roll remains stationary in the cradle. For re-rolling, the user lowers the swivel arm until the motorized roller touches the fabric roll, and turns on a switch to enable the device. It will then automatically re-roll the fabric until the switch is turned off.

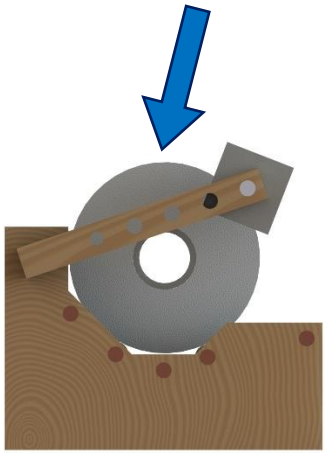
The Cradle solves the problems encountered at G & S Dye by:

1. Utilizing a motorized roller, which eliminates the need for the user to roll the fabric themselves. This is less taxing on their body and allows them to perform other tasks by automating the process.
2. Preventing fabric slippage through rubberized roller surfaces, and maintaining uniform tension through the compression of the top roller. This ensures a tight fabric roll and fewer errors.
3. Incorporating a cradle design that suits all fabric roll sizes while maintaining the spatial layout of the store.



Design Specifications

Fabric Cradle: The cradle of roller tubes provides even support of fabric rolls of varying diameters. The arc shape secures the fabric roll for automated rolling and manual unrolling as the diameter of the roll changes. The design can also allow for fabric rolls of varying lengths and safely support the heaviest rolls present at G & S Dye. The entire device is also small enough in size to be placed on the cutting table at G & S Dye, thus it does not worsen the congestion of the floor space.



Swivel Arm: The adjustable arm can be adjusted back and forth from the cradle for easy loading, unloading, rolling, and re-rolling. It can be auto-adjusted to fit varying fabric roll diameters and ensure optimal fabric contact and compression.

Rubber Roller Tubes: The cylindrical-shaped rollers have a rubberized surface to prevent the fabric from slipping while rolling and unrolling, which prevents creases, air bubbles, and other imperfections on the fabric roll when rolling.

Motors: A pair of motors turn simultaneously to power the top roller that moves the fabric, allowing hands-free rolling with reduced opportunity for errors.

Praxis (ESC102) Team W12

Graham Hoyes
graham.hoyes@mail.utoronto.ca
grahamhoyes.com

George Lu
georgej.lu@mail.utoronto.ca
georgejlu.wordpress.com

Zayne Thawer
zayne.thawer@mail.utoronto.ca
zaynethawer.wordpress.com

Bill (Yuan Hong) Sun
billyuanhong.sun@mail.utoronto.ca
yhbillsun.wordpress.com