

Project Proposal

Cylindrical Bottle Label Applicator

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Abstract:

The wages of the people with cognitive and motor disabilities employed by OE Enterprises, Inc. depend upon their ability to perform various tasks. One of these tasks is to precisely place adhesive labels on various sizes of cylindrical bottles. To complete this task with an acceptable level of accuracy, significant dexterity is required. The goal of this project is to design a device that will enable those that currently lack sufficient dexterity to perform this task, thereby providing them an opportunity to increase their wages and, ideally, their overall quality of life.

Objective:

Goal Statement: To design and produce a device to assist people with cognitive and motor disabilities in placing various sizes of labels on various sizes of bottles in a precise manner. The functional specifications for the cylindrical bottle label applicator are displayed in Table 1.

Table 1: Functional Specifications

Specification (The device will...)	Prioritization (1 -5 stars)
Align label ends within 1/8"	*****
Prevent air bubbles in the bottle-label interface	*****
Be usable by people with mental and motor disabilities without being automatic	*****
Be capable of functioning with different sizes of bottles and labels and accommodating various sizes of label shanks	****
Be composed of simple materials and easily assembled (for purposes of replication)	***
Avoid rendering the bottle unable to be used even if user error occurs	***
Be durable	**
Be aesthetically pleasing	*

Proposed Work:

The device will consist of a stand to hold the label spindle at an appropriate height to allow the spindle to rotate. A drawing of the proposed label holder is shown in figure 1.

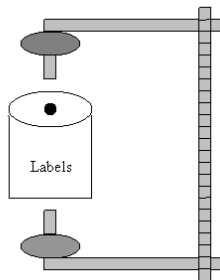


Figure 1: Label Holder

The labels will be fed onto a solid surface with a sharp edge. The label backing will be curled around the edge of the surface and securely affixed to a cylindrical roller that will both keep the label backing in tension and collect it after it has been removed from the labels. The following two figures illustrate two ideas on how this can be accomplished.

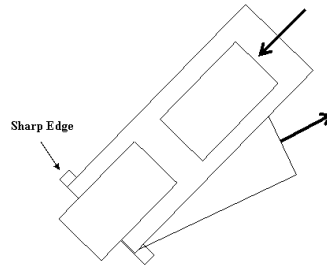


Figure 2: Label Backing Remover

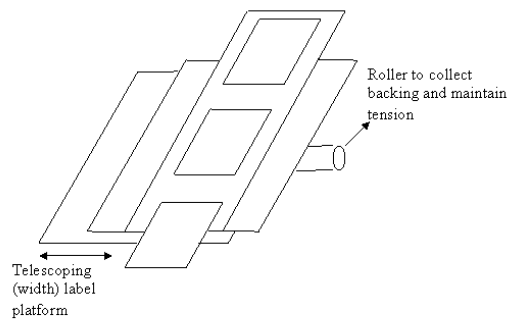


Figure 1: Label Backing Remover (Detailed View)

A vice clamp buffered with two pieces of rigid foam will hold the bottle horizontally in alignment with the label feeder. The edge of the label will be affixed to the bottle and the bottle will be rotated 360° to complete the attachment of the label to the bottle. A block diagram summarizing the bottle labeling process is presented in figure 6.

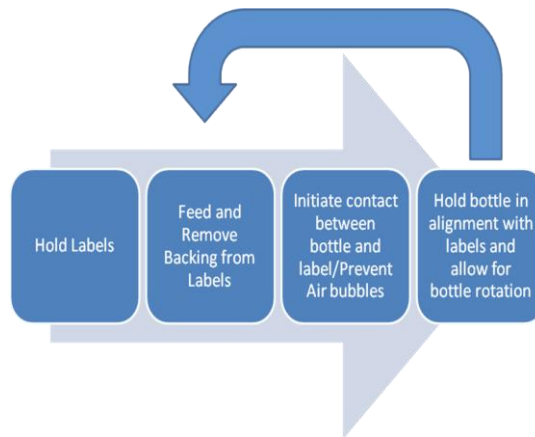


Figure 4: Block diagram of the bottle labeling process

Schedule and Budget:

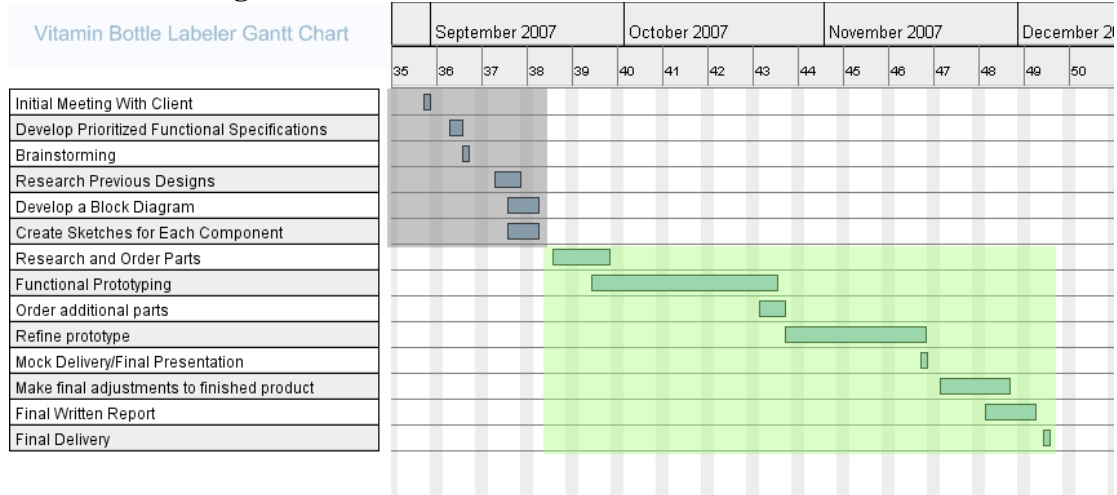


Figure 5: Schedule

Below is a table estimating the cost of building the device. At this point, this is just a rough estimate. We are being supported by the National Science Foundation under Grant No. BES-06-10534. Our total contribution to this point is \$400.

Table 2: Proposed Budget

Item	Cost
Sheet and Solid Metal	\$100
Wood	\$50
PVC piping	\$30
Foam Insulation	\$40
Miscellaneous (nuts, bolts, screws, ball bearings)	\$50
Total	\$270

Project Team:

Matthew Dekow, Gregory Meyers, and Cameron Smith are three senior biomedical engineering students in the Pratt School of Engineering at Duke University enrolled in a design course titled Design for People with Disabilities. This course is taught by Professor Larry Bohs, Ph.D., Assistant Research Professor in Biomedical Engineering.

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