Final Design Description

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Project Goal

To develop a device to fabricate low-cost and customizable menstrual hygiene products (especially sanitary pads) that the International Federation of the Red Cross (IFRC) can use in communities such as refugee camps, providing women with a sanitary, self-sufficient method to manage their hygiene needs while providing them with a livelihood activity.

Program Description

This project will be undertaken by a team of four students studying at the University of Texas Austin studying in the Cockrell School of Engineering in partnership with the International Federation of the Red Cross and Mr. William Carter, who pinpointed this challenge related to women's hygiene.

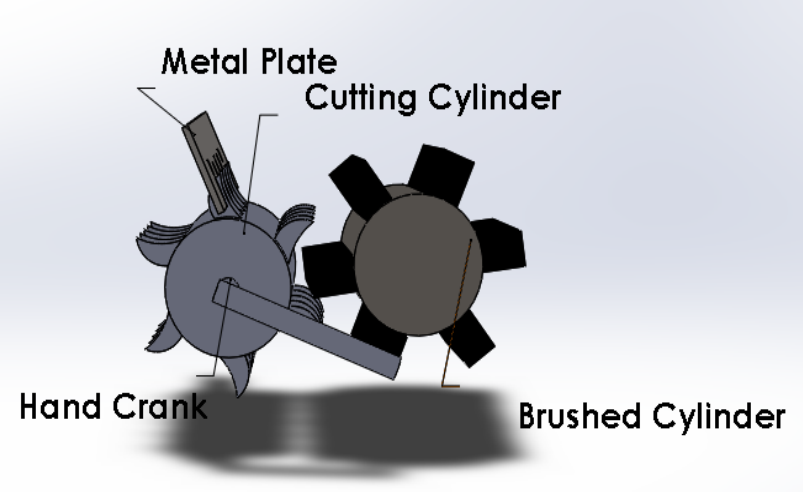
Project Description

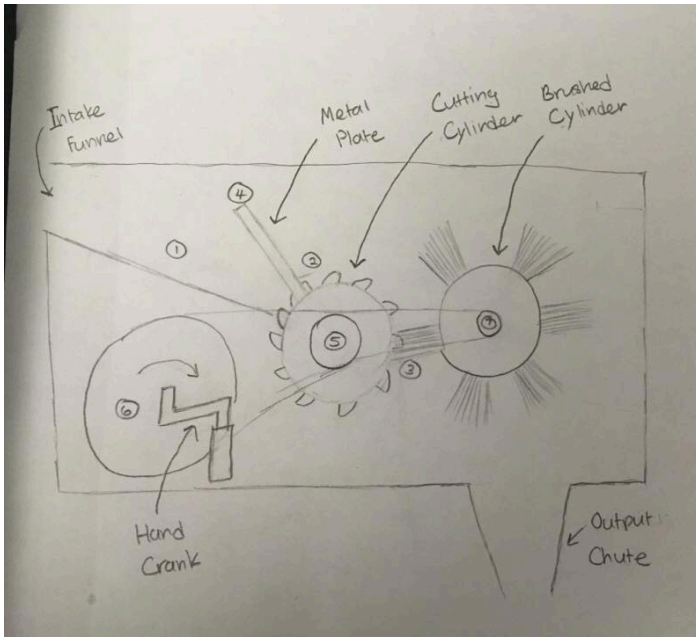
To fabricate sanitary pads, we have created a set of two devices. The first device will take as a raw material input, un-spun cotton, This device will grind the un-spun cotton until a consistency similar to loose-fill insulation is achieved. The second device will compress and cut the ground cotton into a sanitary pad. More details are given below:

1. **Key Features**
    a. No requirements of electrical power
    b. Flexibility to allow women to create hygiene products to their preferences
    c. Simple operation
    d. Cost efficiency
2. **Raw Material Input**
    a. Un-spun/raw cotton with seeds removed (preferred)
    b. Other fibrous material such as hemp fiber, shredded fabric, or shredded paper/cardboard
3. **Sanitary Pad Output**
    a. Pad made from compressed cotton fiber
    b. Adjustable thickness and length

Equipment Description

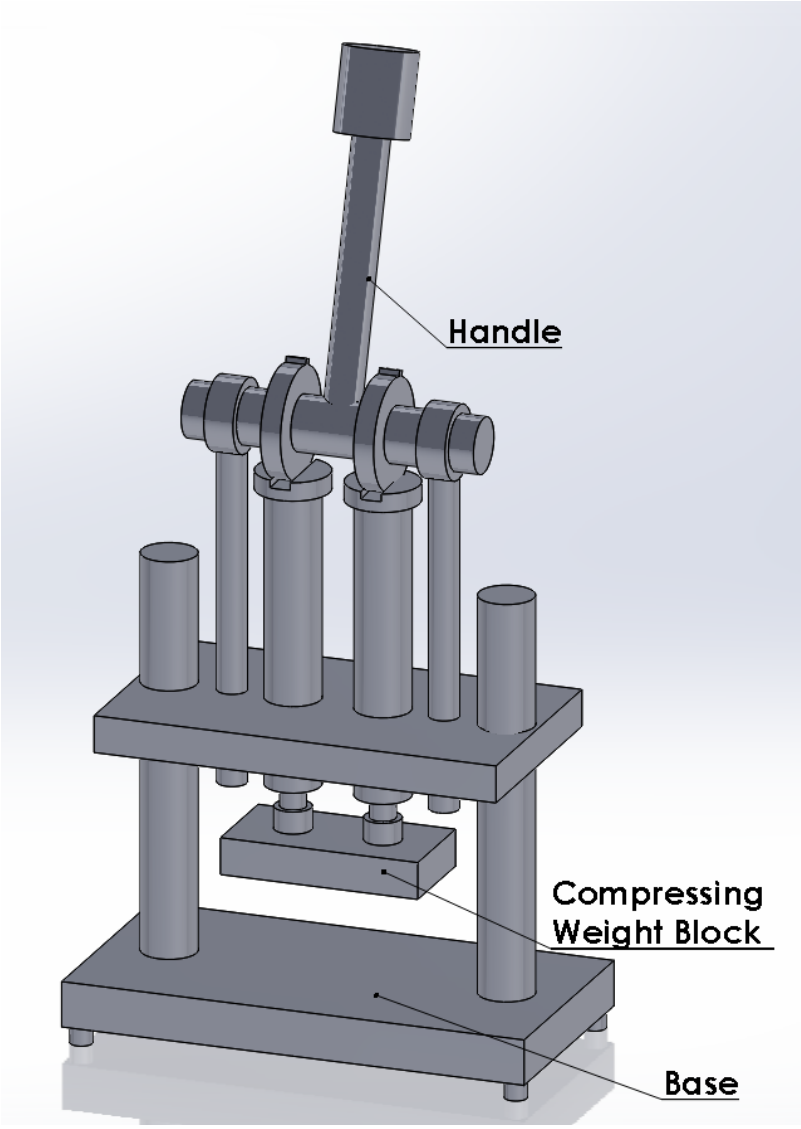
1. **Grinder:** Cut up the un-spun cotton into smaller pieces so that they are easier to work with. Note: The picture below only shows the mechanism to grind up the cotton. This mechanism will be encompassed in a container with an intake funnel and output chute.
    a. Feed un-spun cotton into the top funnel
    b. Turn the crank.
    c. As the crank turns, the cutting cylinder (which has blades protruding from it) will pull the cotton through the slits in the metal plate and cut the cotton.
    d. Brushed cylinder will simultaneously remove ground up cotton from the blades on the cutting cylinder.
    e. Ground up cotton drops through chute into a collection container for use in compressor





2.

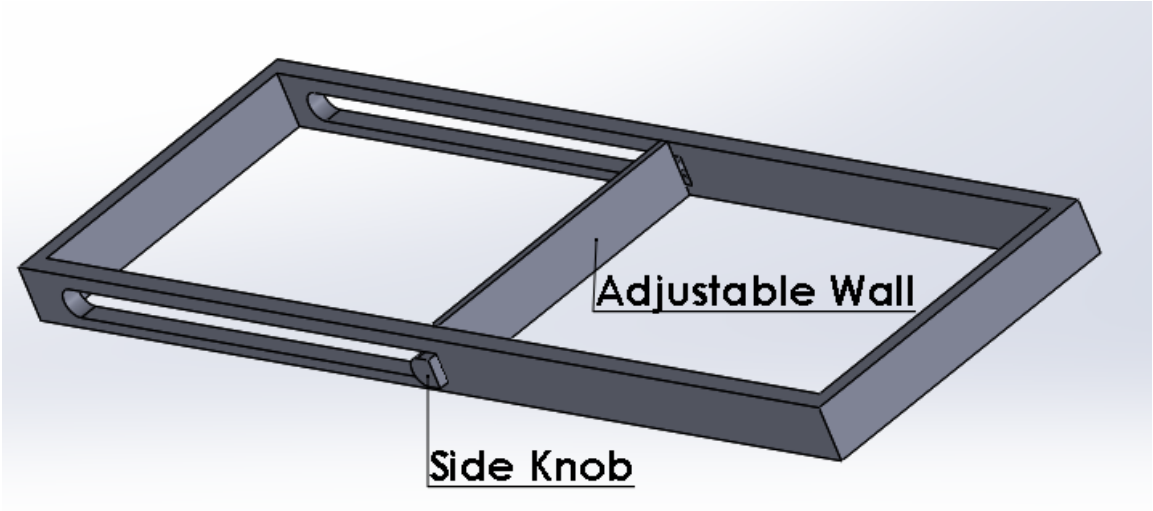
Compressor: Uses the smaller pieces of cotton and apply force to make them into compacted absorbent, sanitary pad-shaped pieces



a. Place large rectangular mold on the base of the machine
b. Fill the mold with ground cotton
c. Pull down on the handle, which brings down the compressing weight block and creates a large square of compressed material (stock piece)
d. Place the dies on top of the compressed material stock piece made in previous step (Dies will be adjustable to make pads of different sizes)

e. Pull the handle down again, again bringing down the compressing block. This time the weight of the compressing weight block will be used to punch out individual sanitary pads from the cotton stock piece.
f. Feed the excess cotton pieces back into the grinder

3. **Adjustable Die:** Adjustable piece that punches or cuts out sanitary pads from the compressed cotton stock piece that can be adjusted in real time to allow the women to determine exactly what length they would like the sanitary pad. To adjust:
    a. Twist the side knob into the horizontal position
    b. Slide the adjustable wall to the desired length
    c. Twist the side knob into the vertical position to lock the adjustable wall in place



4. **Sleeve:** Cover the compacted cotton pieces with sanitized pieces of cotton fabric. This will make the final product more comfortable and hold the compressed fibers together.
    a. Use thin fabric (similar to a dryer sheet) to create a sleeve for the compressed fiber core
    b. 

    c. Cut our rectangles of fabric and sew together three sides to create a sleeve
    d. Insert the compressed fiber core into the sleeve and stich together the third side
    e. Options to complete this step
        i. Hand stitching

ii. Off the shelf manual sewing machine