

**SOUTH ASIAN INSTITUTE OF TECHNOLOGY AND MEDICINE
FACULTY OF ENGINEERING
DEPARTMENT OF MECHATRONICS ENGINEERING**

**ME301-INTRODUCTION TO MANUFACTURING PROCESSES
COMPOST FILTER AND SIFTER**

INSTRUCTED BY: Dr. S. Sendanayake

NAME: AMILA ALEXANDER
STUDENT ID: EN17003MEF0016
FIELD: MECHATRONICS ENGINEERING
DATE OF PER:2018/04/06
DATE OF SUB:2018/04/20

CONTENTS

1. INTRODUCTION
2. BACKGROUND AND THEORY
3. DESIGN
4. MATERIALS, TOOLS AND MACHINES
5. TIME ALLOCATION
6. ESTIMATED BUDGET

INTRODUCTION

THE PRODUCT

This product, simply put is a filter which separates good useable compost from the unnecessary inorganic substances such as rocks and/or other debris which are not useful for plant production. It is a slightly more mechanized version of the normal filtering process which involves rapidly shaking a screen to separate the particulates for the desired materials. Unlike the aforementioned method using a revolving circular mesh adds benefits such as

1. Less man power required (less labour intensive)
2. More efficient than manual sifting
3. Unwanted substances are gracefully disposed at either ends of the sifter
4. Ability to sift a large amount of compost

Using conventional methods to achieve the same amount of work through manual sifting would require more than one user for the sifting process if they were aiming to produce the same output as the rotary sifter. This is because a motor, like any piece of technology drastically reduces the effort humans needs to put in to get a task done. The compost filtered throw the product has a specific particulate size no larger than the type of mesh used. If a fine mesh is used to separate the mixture a product with smaller grain size ca be obtained, likewise a larger mesh type would produce bigger chunks of compost. The tumbling action of the motor also helps to reduce large chunks into smaller pieces via abrasion and wearing.

More about Compost and the need for sifting

Compost is an essential ingredient for the production of good healthy crops that can be sold to the market. For the production of high quality crops the quality of compost must also be considered. The quality of good compost is generally determined by how well it can supply the required nutrients to the crop, it must also have the perfect water retention properties that will enable it to absorb just the right amount of water to keep the region around the plant moist but not damp. Compost also fend off unwanted harmful substances that might make their way into the plot. For economic reasons the and since compost is a must in all quality crop producing industries the way in which it must be used in important. Too much compost can cause large budget and can reduce the profits of the farmer, too little and the crops will be malnourished. The farmer must make the maximum use of compost while maintaining proper standards. In order to do this compost must be distributed in a way which maximizes its surface area. Since the best way to maximize the surface area of a substance is to reduce it into smaller grain size particles the compost must be processed in a way which “sifts” the large chunky particles into smaller finer ones.

BACKGROUND AND THEORY

There are 3 main components,

1. Main superstructure: includes the body, wheels and compost collector
2. Circular Mesh Frame
3. Motor and belt driven rotator

1.) Main super structure

Responsible for holding the entire processing device upright and off the ground, creates the frame in which the rotating apparatus is mounted on to. Also holds the motor in place which allows the belt driven mechanism to be fastened on to.

2.) Circular Mesh Frame

The compost passes through this mesh and reduced into smaller particles. The main part of the product which is responsible for most of the work. The circular nature of the apparatus enables it to rotate about its central longitudinal axis.

3.) Motor and belt driven rotator

The motor is responsible for turning the circular mesh frame. This creates an action similar to vibration but is less straining on the machine which means it can be used for prolonged periods of time without having to constantly repair the machine.

3D view of the product

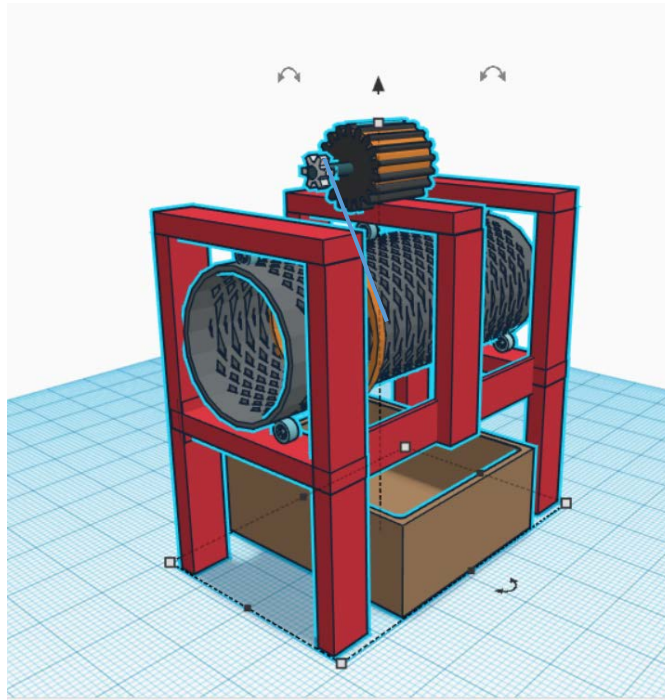


Figure 1.0

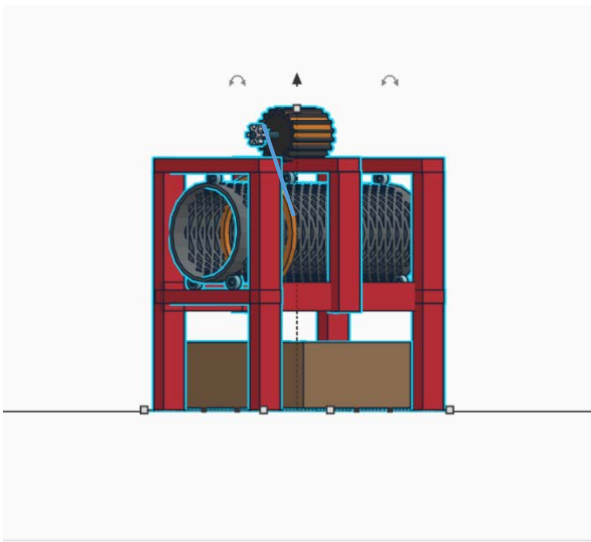


Figure 1.2

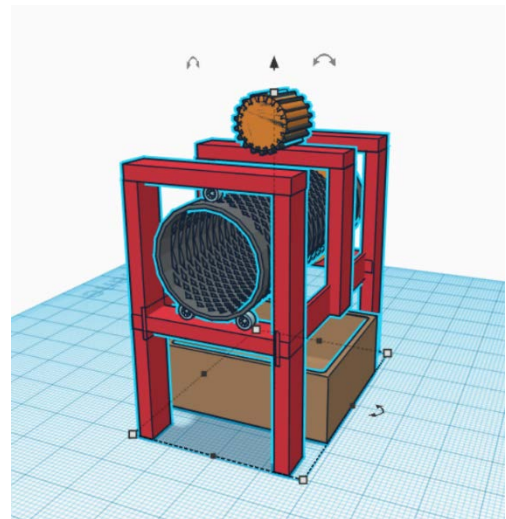
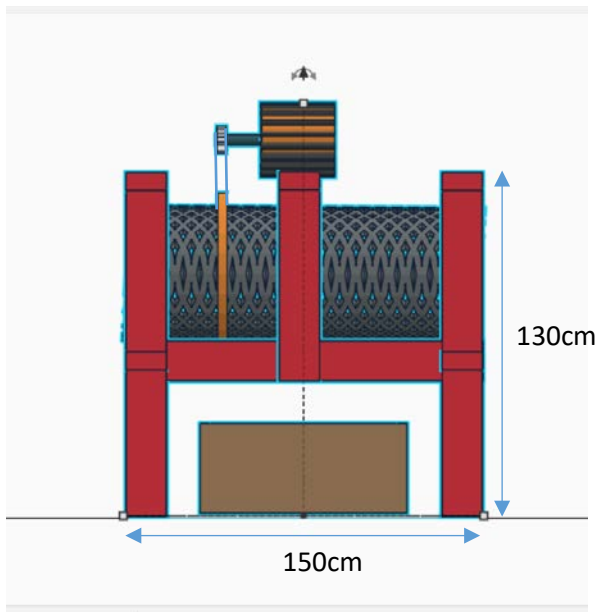
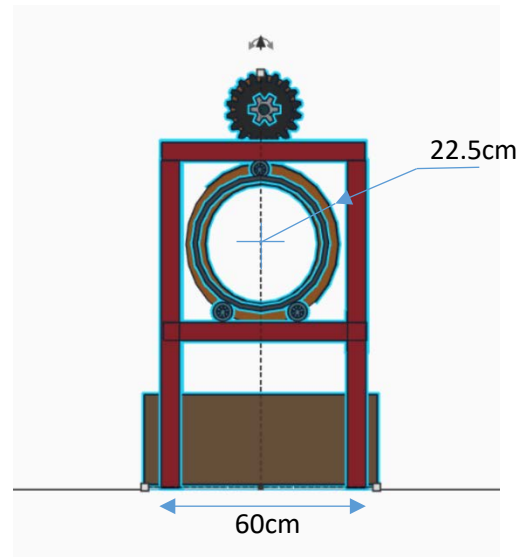


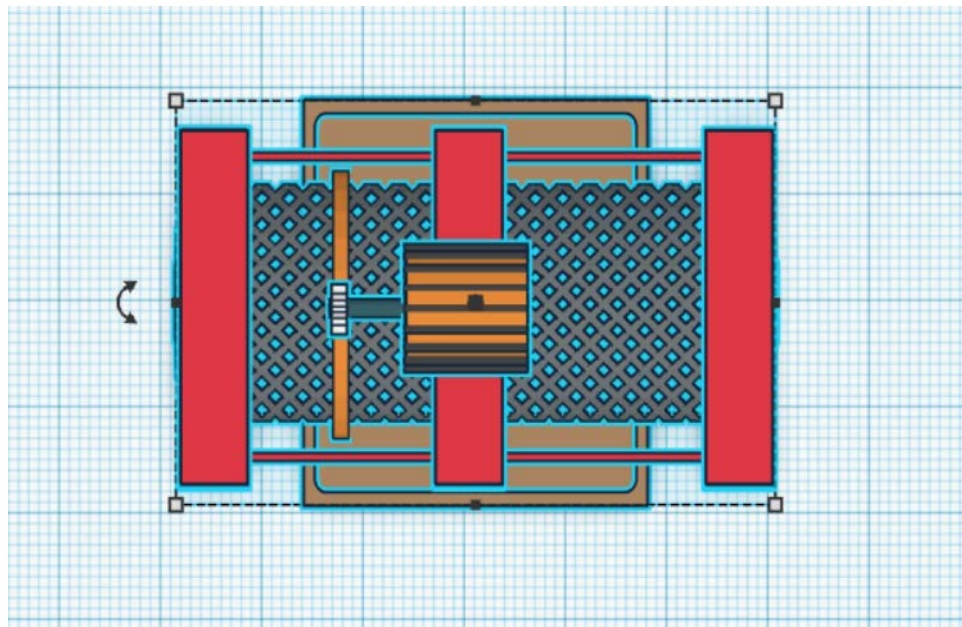
Figure 1.1



Side View (Figure 1.3)



Front View (Figure 1.4)



Top View (Figure 1.5)

MATERIALS, TOOLS AND MACHINES

MATERIALS

- Mild Steel sheets
- Aluminum Checkered Plates
- Aluminum Mesh
- Belt
- Six Groove Wheels
- Cast Iron

OUTSOURCED PARTS

- Electric Motor
- Bearing and housing units
- Cast iron pulley
- Gear wheels

TOOLS AND MACHINES

- Grinder
- Oxy Fuel Gas Cutting
- Lathe Machine
- Portable Mini Metal Cutter
- Metal Cutting Scissors
- Hand drill
- Arc welder
- Brazing torch
- Hacksaw
- File

Process Plan:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Making basic structure of the machine							
Making the rotating mechanism							
Making the depositing tray							
Testing & Finishing							

Table 1.0**ESTIMATED COST**

Item	Amount Rs.
Electric motor	3,000.00
Bearings and Gears	1,200.00
Box bars (25 mm x 25mm)	900.00
Aluminum Sheets	4,000.00
Wheels	3,000.00
Metal mesh	900.00
TOTAL	13000.00

Table 1.1