

**TA201A: Introduction to Manufacturing Processes**  
**Engineering Metallurgy Lab**  
**2021-22 Semester - I**

**GROUP PROJECT REPORT**  
**S7G5**  
**CHAFF CUTTER**

Course Instructor- Dr. Sudhanshu Shekhar Singh

# **GROUP MEMBERS**

Ayush Prajapati(200250)

Ashish Sharma(200211)

Ayush Agarwal(200236)

Ayush Choudhary(200239)

Avantika Mirock(200228)

Ayush Pandey(200248)

Attunuru Neeladri Reddy(200223)

# **TABLE OF CONTENTS**

- Introduction
- Isometric Drawing of Overall Assembly
- Parts of the chaff cutter
- Working of the chaff cutter
- Description of various parts and their isometric and engineering drawings
- Materials and manufacturing processes used for the parts
- Cost analysis
- Work Distribution

# **INTRODUCTION**

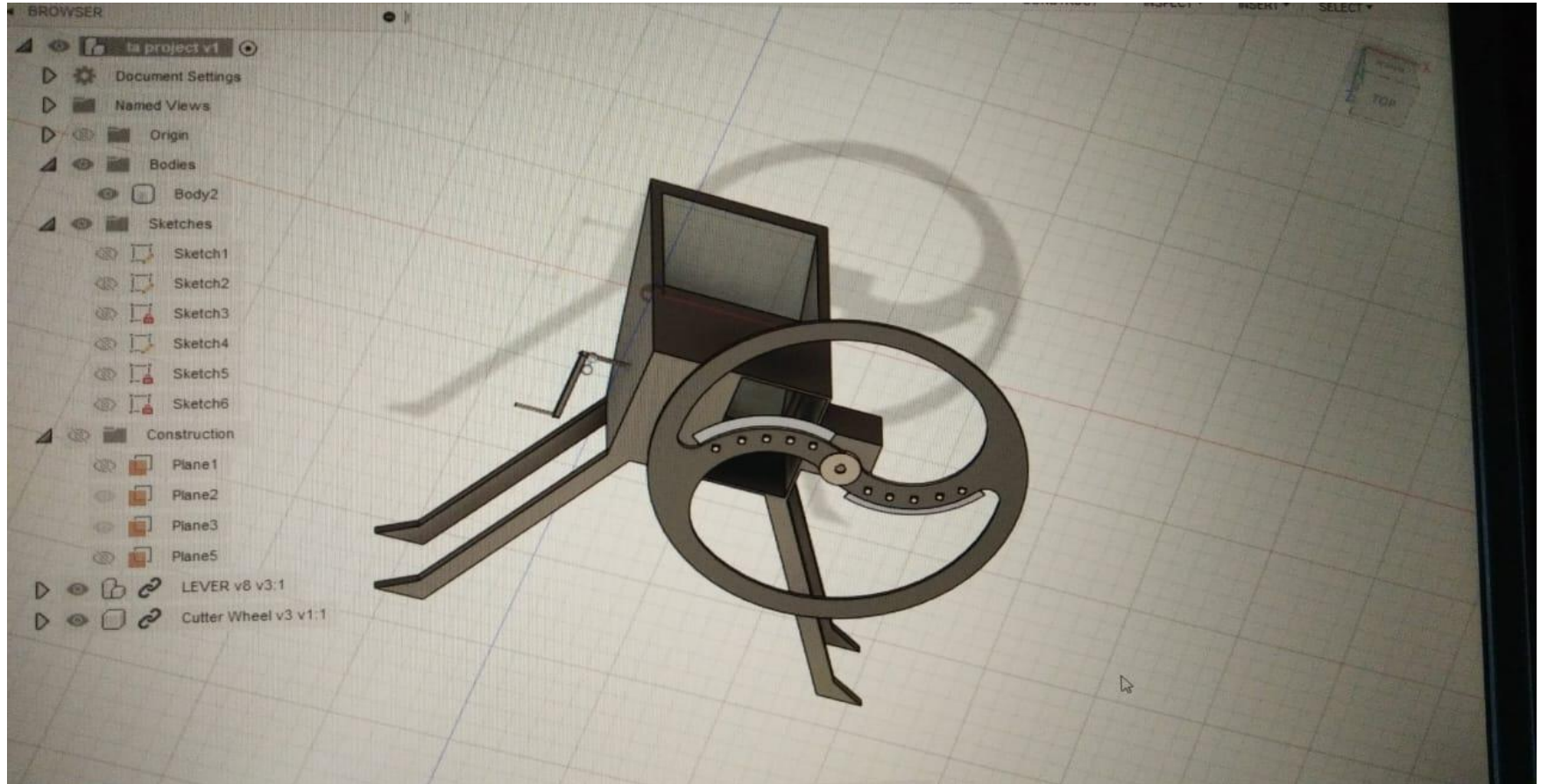
A chaff cutter is a mechanical device for cutting straw or hay into small pieces before being mixed together with other forage and fed to horses and cattle. This aids the animal's digestion and prevents animals from rejecting any part of their food. - Source Wikipedia

Chaff and hay played a vital role in most agricultural production as it was used for feeding horses. Chaff cutters still continue to play a role, especially in India which has traditionally been an agricultural country. It's a simple and elementary machine which is nevertheless quite useful and often indispensable for farmers in various agricultural scenarios. Chaff cutters may be motorised or hand-driven. We have opted for a smaller-scaled version of a hand-driven chaff cutter because it doesn't need electricity as many parts of our country can't rely on uninterrupted electrical power.

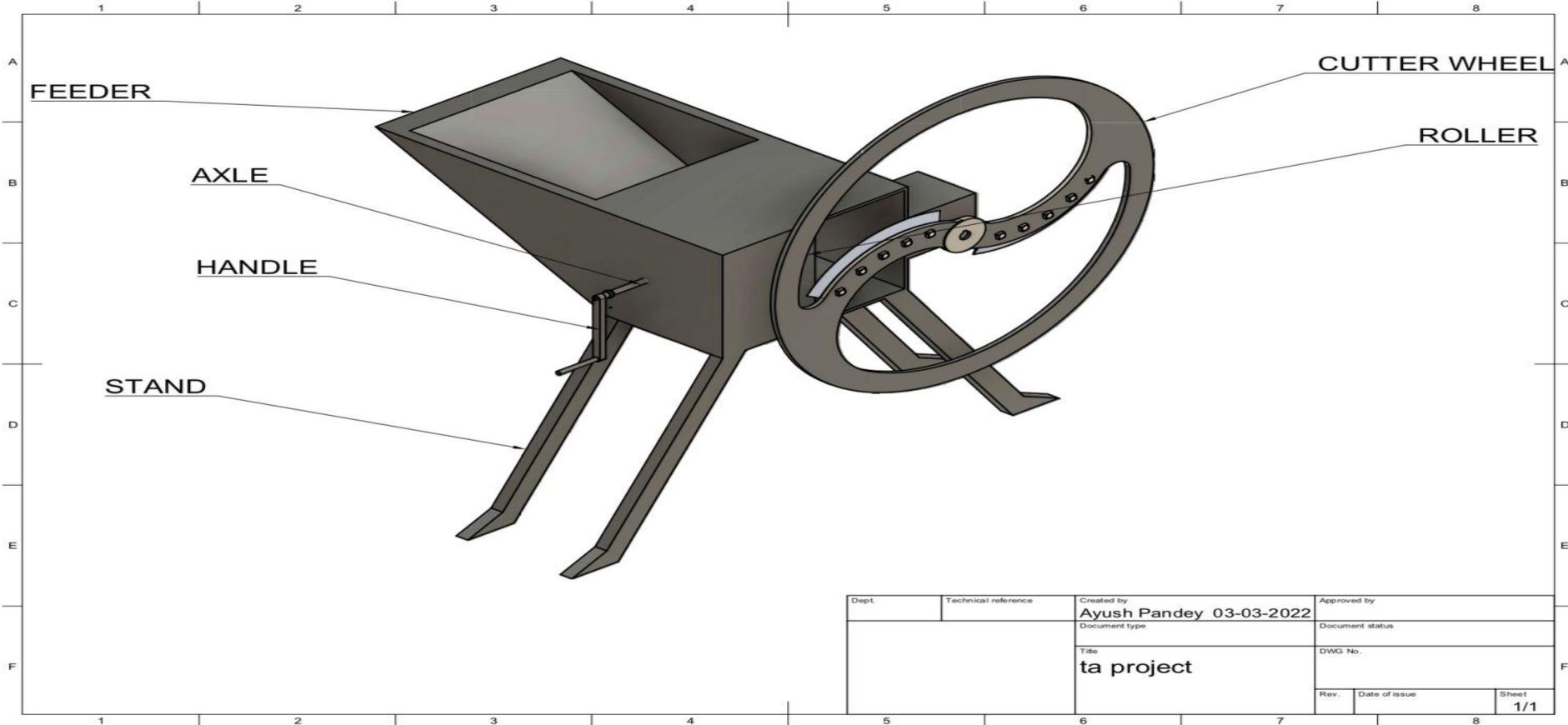
## **Overall working of the chaff cutter**

The cutting wheel does the main work of cutting up the chaff. Chaff(hay or grass) is fed through the feeder. The is sloping downwards to facilitate the feeding of the chaff. The rollers help pull the chaff into the turning wheel. The axle of the wheel is connected to the gears which in turn are connected to the rollers. A handle is attached to one of the rollers. When the handle is operated, it turns the roller which turns the axle and the other roller through the gears. The axle rotates the cutting wheel which cuts the chaff up, while the rollers help in pulling the chaff up to the wheel. The whole assembly is mounted on a stand.

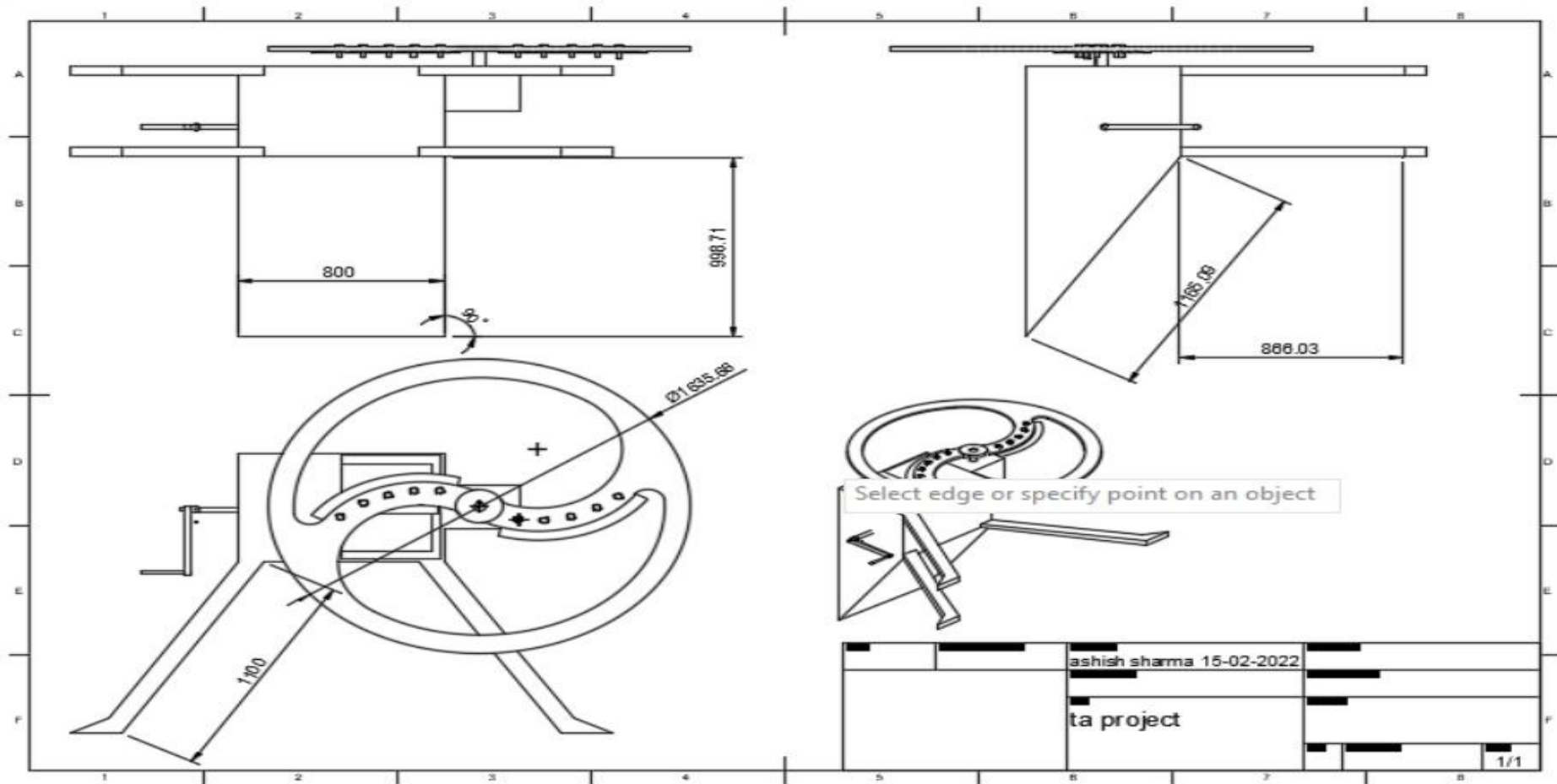
# Overall assembly



# NAMING OF DIFFERENT PARTS OF CHAFF CUTTER:



# Orthographic View





# ISOMETRIC DRAWING OF ALL PARTS

1.GEARS

2.HANDLE

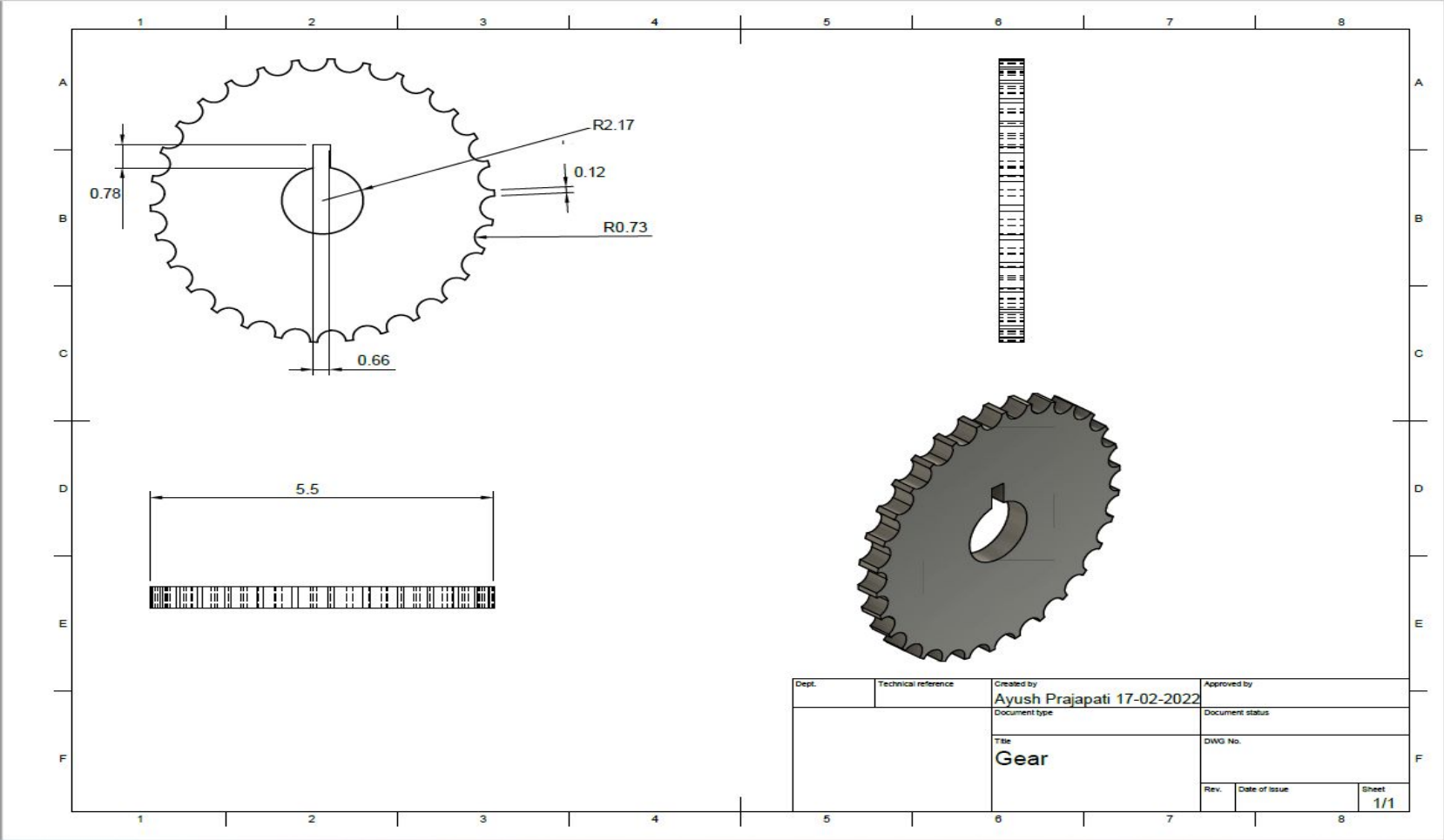
3.AXLE

4.CUTTING WHEEL

5.ROLLERS

6.STAND + FEEDER

1.Gear



Dept.	Technical reference	Created by Ayush Prajapati 17-02-2022	Approved by		
		Document type	Document status		
		Title Gear	DWG No.		
			Rev.	Date of issue	Sheet 1/1

Engineering drawing of a mechanical part, showing three views: Front View, Top View, and Side View, along with an Isometric View.

**Front View:** Shows the main body of the part. Dimensions include a total length of 70, a diameter of 2.5 at the top, a diameter of 5 at the bottom, and a height of 40. The base has a width of 2 and a thickness of 1.6.

**Top View:** Shows the plan view of the part. Dimensions include a radius of R6.45 at the top left corner, and radii of R2 and R3 at the bottom right corner.

**Side View:** Shows the side profile of the part. Dimensions include a total height of 29.4, a diameter of 2.5 at the top, a diameter of 5 at the bottom, and a thickness of 1.6. The top edge has a chamfer with dimensions 8, 5, 4, and 2.

**Isometric View:** A 3D perspective drawing of the part, showing its overall shape and dimensions.

**Technical Drawing Data:**

Dept.	Technical reference	Created by	Approved by
		Ayush Pandey 17-02-2022	
		Document type	Document status
		Title	DWG No.
		HANDLE/LEVER	
Rev.	Date of issue	Sheet	
		1/1	

# GEARS

Gear is an important component of Chaff Cutter Machine. It helps in changing rotational motion of axle into translational motion of chaff through bevel gear mechanism.

## Manufacturing of Gears

It is manufactured by Casting, Forging and Extrusion

## Material Used

Mild Steel Discs of required thickness and diameter for 2 gears.

# Handle

It is basically used to rotate the rollers which in-turn rotates the cutter wheel.

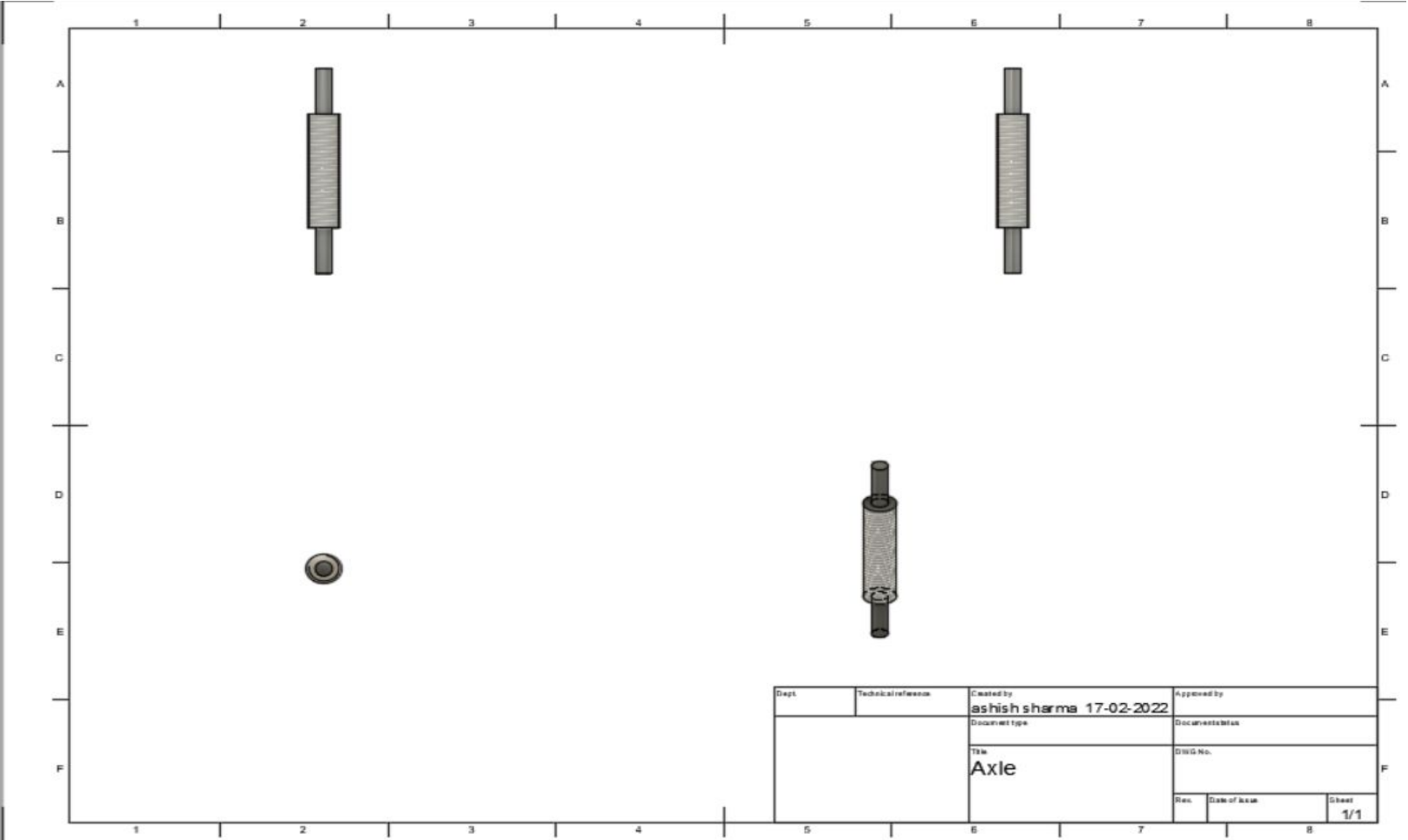
Manufacturing Process-

Casting, Welding, molding

Material Used-

Steel Rods, a suitable material for grip and ball bearing for rotation.

3. Axle



Dept.	Technical reference	Created by ashish sharma 17-02-2022	Approved by		
		Document type	Document status		
		Title	DWG No.		
		Axle	Rev.	Date of Issue	Sheet 1/1

# Axle

Axle is circular component with ridges and it is held between the two gears.

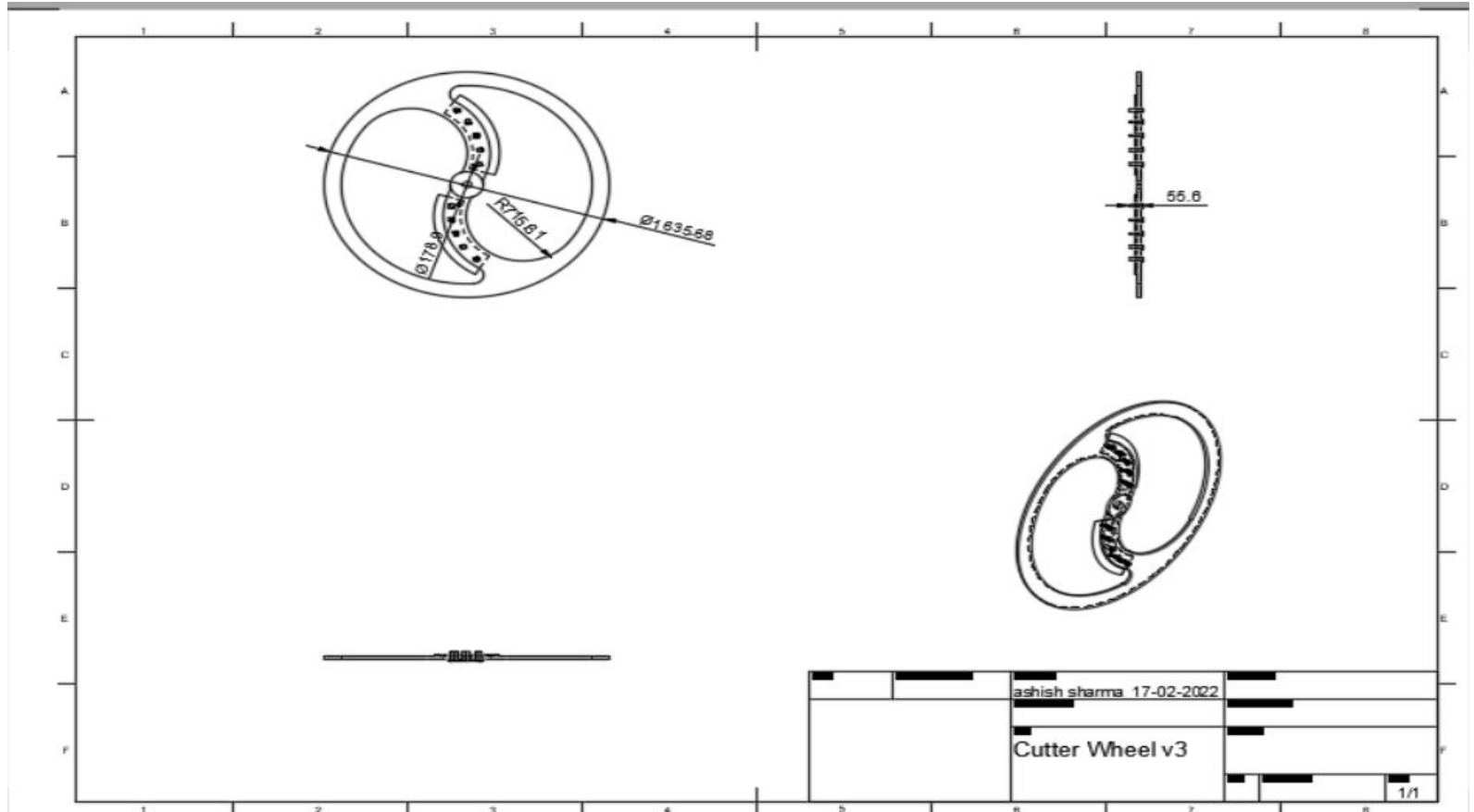
## Manufacturing of Axle

It is manufactured by casting process and forging while also using extrusion.

## Material Used

Cast Iron, Steel Rod(mild)

## 4. CUTTING WHEEL





# CUTTING WHEEL

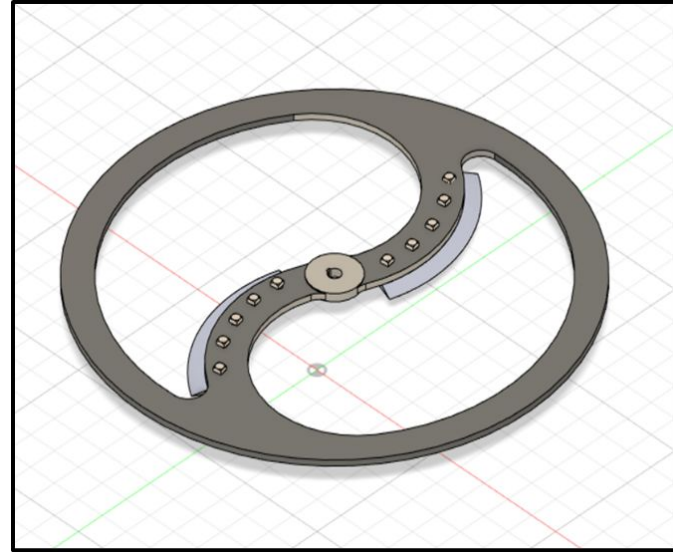
Cutting wheel is the fundamental piece of the machine which really cuts the grain into little pieces which can be then taken care of to ponies and cattle. This helps the creature's assimilation and keeps creatures from dismissing any piece of their food.

## Manufacturing of Cutting Wheel

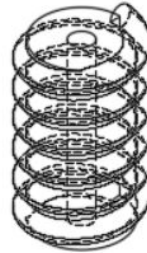
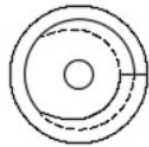
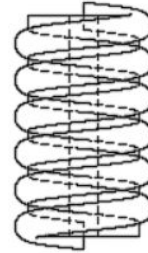
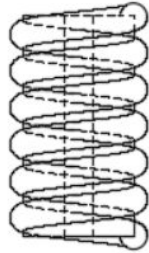
- Cutting
- Heat Treatment and Grinding

## Material Used

Iron sheet and also steel sheets.



## 5. Rollers



Dept.	Technical reference	Created by ashish sharma 17-02-2022	Approved by	
		Document type	Documentation	
		Title rollers	DWG No.	
		Rev.	Date of issue	Sheet 1/1

# Rollers

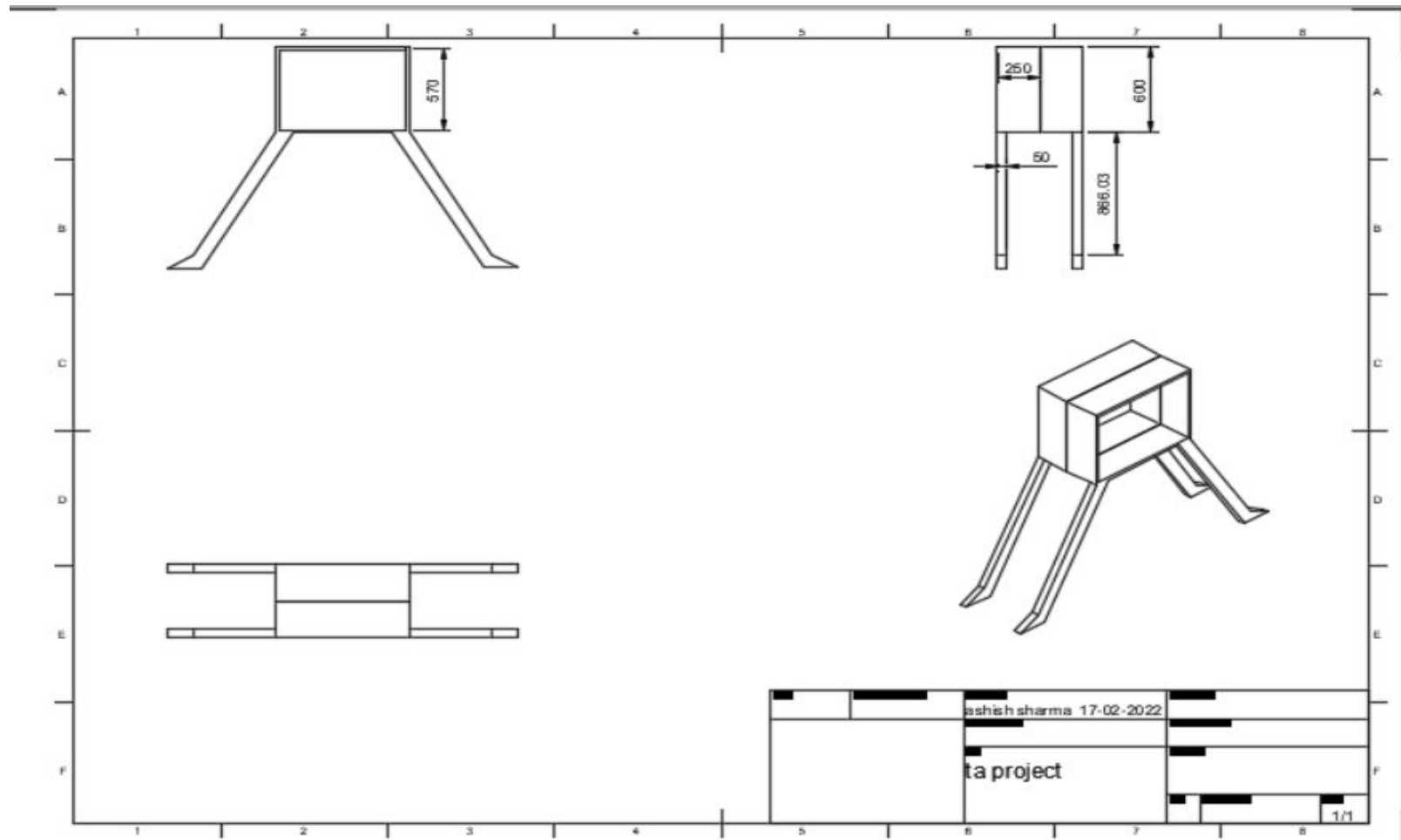
Manufacturing Process-

Casting and Extrusion

Material Required-

Mild Steel Rod and cast iron

## 6. STAND + FEEDER



# Stand and Feeder

Manufacturing Process-

Stand- Welding, Bending, Riveting

Feeder- Shearing, Welding

Material Used-

Stand- Mild Steel Rod

Feeder- Mild Steel Sheets

# Work Distribution

<u>Name</u>	<u>WEEK 1</u>	<u>WEEK 2</u>	<u>WEEK 3</u>	<u>WEEK 4</u>	<u>WEEK 5</u>	<u>WEEK 6</u>
ASHISH SHARMA(200211)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawings Of stand of chaff cutter	Isometric Drawing of Stand	Worked on slide and did further work on parts
AYUSH CHOUDHARY(200239)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawing Process of feeder	Isometric Drawing of Feeder	Worked on slide and did further work on parts
AYUSH AGARWAL(200236)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawings of CUTTER WHEEL	Isometric Drawing of cutter wheel	Worked on slide and did further work on parts
AYUSH PANDEY(200248)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawings of Handle	Isometric Drawing of handle	Worked on slide and did further work on parts
Attunuru Neeladri Reddy(200223)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawing Rollers	Isometric Drawing of rollers	Worked on slide and did further work on parts
AYUSH PRAJAPATI	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawing Of Gear	Isometric Drawing of gear	Worked on slide and did further work on parts
AVANTIKA MIROCK(200228)	Sharing Ideas	Discussion of Ideas	Finalization of Ideas	Drawing of axle	Isometric Drawing of axle	Worked on slide and did further work on parts

S.No	Name of the part	Materials used	Quantity	Cost(approx)
1	Axle	Mild steel rod diameter 6mm	1	26 Rs
2	Cutter Wheel	Iron sheet frame +steel blades	1	150(frame)+50(blades)=200 Rs
<u>3</u>	<u>Gear</u>	<u>Mild steel disc of diameter 20mm</u>	<u>2</u>	<u>2*30=60 Rs</u>
<u>4</u>	<u>Hopper</u>	<u>Mild steel sheet of thickness 0.5mm</u>	<u>1</u>	<u>104 Rs</u>
<u>5</u>	<u>Roller</u>	<u>Mild steel rod of 6mm thickness</u>	<u>2</u>	<u>108 Rs</u>
<u>6</u>	<u>Stand</u>	<u>Mild steel angle</u>	<u>1</u>	<u>19 Rs</u>
<u>7</u>	<u>Handle</u>	<u>2 steel rods.polystyrene.ball bearings</u>	<u>1</u>	<u>7 Rs</u>
<u>8</u>	<u>Cage</u>	<u>Iron net</u>	<u>2</u>	<u>2*20=40 Rs</u>
				<u>Total=564 Rs</u>

# **Acknowledgements**

We would like to express our sincere gratitude to our tutor Dr. Lichchhavi and our lab-in-charge Mr. Anil Verma for their support, insight and instruction in this project. Their suggestion on some safety addition on the chaff cutter allowed us to work towards it. Their support and direction were helpful throughout the execution of the project.

We thank Dr. Sudhanshu Shekhar Singh, Course Instructor TA201 for providing us with this opportunity to explore our creativity and learn through the lab manufacturing processes.

We also thank our TA Shruti Srivastava and Rahul Verma for their valuable time and effort.