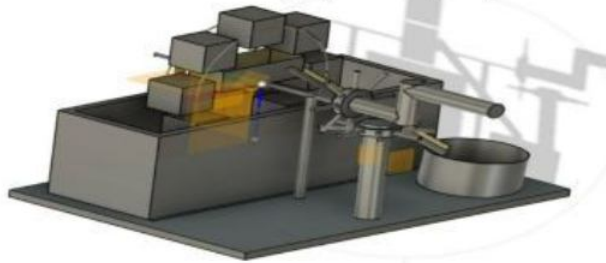


# **TA201A: Manufacturing Process 1**



Project Report  
Wednesday (Group 5)



## **“Water Lifter”**

**Course Instructor:** Dr. Nilesh Badwe  
**Tutor:** Dr. Raghupathy Yuvraj  
**Lab-in-charge:** Mr. Anil Kumar Verma  
**TA's:** Parmanand Tyagi & Rakesh Maurya  
**Course Staff In-Charge:** Mr. I.P. Singh

### **GROUP MEMBERS:**

<b>Name</b>	<b>Roll No.</b>	<b>Signature</b>
Dharmraj	210336	
Dilkesh Meena	210345	
Divyansh Mittal	210358	
Durgesh Anand	210366	
Enna Gupta	210371	
Eshika Yadav	210372	
Gaurav	210384	
Gaurav Sharma	210388	

# **Table of Contents**

<b><u>S.No.</u></b>	<b><u>Topic</u></b>	<b><u>Page no.</u></b>
1	Acknowledgment	4
2	Introduction	5
3	Motivation	6
4	Group Member Work Distribution	7
5	Material List	8
6	Isometric drawing	9
7	<b>Parts of water lifter</b>	
	1. Wheel without spoke	10
	2. Wheel with spokes	11
	3. Wheel Assembly	12
	4. Tank	13
	5. Bucket	14
	6. Support rods	15
	7. Slider	16
	8. Collecting tank	17
	9. Base Plate	18
	10. Handle	19
	11. Waterfall tank	20

# Acknowledgment

The completion of this project is attributed to a lot of people, and we feel grateful and blessed to have been provided an opportunity for the same.

We sincerely express our gratitude to our course Instructor, Dr.Nilesh Badwe, for their valuable support and advice in this project and also for providing us an opportunity and resources to showcase our creativity.

We would also like to express our sincere gratitude to our tutor, and our Labin-charge, Mr. Anil Kumar Verma for their support, motivation and valuable input during the planning and design of this project.

Special thanks to our TA,

**Dr.Raghupathy Yuvraj**

For giving us his valuable time.

# Introduction

Generally, water flows at ground level. Water lifter is a tool which is capable of raising the water from a lower level to a higher level. In this device, a large wheel is fixed up about the water source (tank in this case). Mechanically this wheel is moved with the help of a shaft to fetch the water from the tank and pour onto the slider. Water flows through the slider and gets collected in a reservoir.

It is a less expensive method that was used in irrigation. This technique is also environmentally friendly, so it can be used everywhere.

Keeping the above things in mind, we have tried to build a simple sample, with a mechanism that depicts the coordination between wheel, shaft, slider and supporting rods.

# **Motivation**

The motivation behind our project “WATER LIFTER” project is to understand the structural and functional aspects of a water lifter.

This machine helps to increase water availability for irrigation, drinking, and other domestic or agricultural purposes, by transporting water from a source (such as a well, stream or reservoir) to a desired location with ease and efficiency. The bucket and wheel design reduces the physical effort required to lift water and enables the transfer of water to greater heights and distances, making it an effective solution for water management in areas with challenging terrain.

As electricity has no role to play in this technique, it has been developed and used rapidly in ancient times. In this era, many water-lifting devices and machines have been introduced on a large scale. We want to learn and apply the different basic tools and techniques along with the materials used to build this structure.

The knowledge of manufacturing processes learned in TA201 applied to such large scale engineering projects gives us a real feel of how processes work in real life systems.

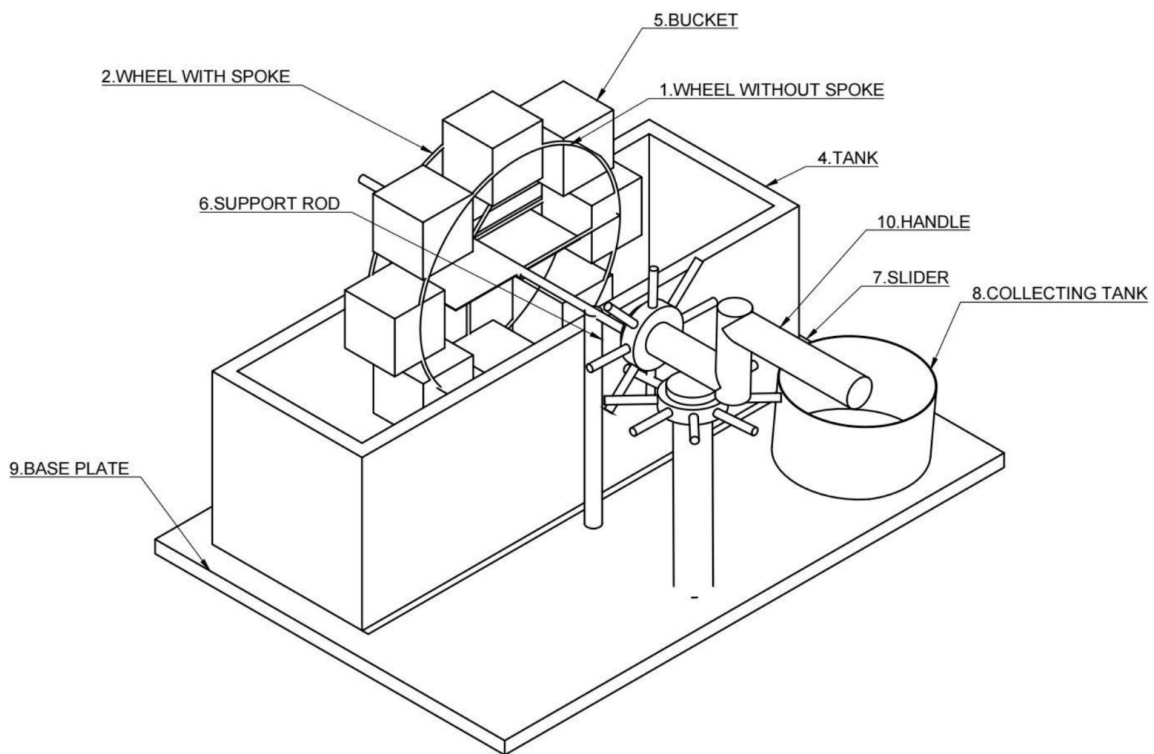
## **Work Distribution**

MEMBERS	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
Dharmraj	Wheel Formation	Wheel Formation	Wheel Assembly	Water Flow Mechanism	assembly
Dilkesh Meena	Welding	Wheel Formation	Shaft Mechanism	Water Flow Mechanism	assembly
Divyansh Mittal	Bucket Formation	Tank Formation	Wheel Assembly	Slider Formation	assembly
Durgesh Anand	Welding	Welding	Tank Formation	Water Flow Mechanism	assembly
Enna Gupta	Bucket Formation	Tank Formation	Tank Formation	Slider Formation	assembly
Eshika Yadav	Bucket Formation	Wheel Formation	Tank Formation	Slider Formation	assembly
Gaurav	Wheel Formation	Welding	Wheel Assembly	Slider Formation	assembly
Gaurav Sharma	Welding	Wheel Formation	Shaft Mechanism	Water Flow Mechanism	assembly

## Materials Required

S.No	Object	Materials	Dimensions and Estimated Weight	Quantity
1	Wheels (Rim)	Mild Steel Round Rod (8 mm dia.)	232 diameter, 8 mm thickness	2
2	Wheels (Spokes)	Mild Steel Round Rod (3 mm dia.)	116 length. X 6	8
3	Tank	Mild Steel Sheet 4 ft x 8 ft x 0.5 mm	350x120x120 x0.5mm Thickness (1548^2)	1
4	Collecting Tank	Galvanized Sheet	Cylinder with Diameter = 100mm Height = 50mm	1
5	Base	Mild Steel Sheet 4 ft x 8 ft x 2.0 mm	400mm x 280mm x 2mm thickness	1
6	Bucket	Galvanized Iron Sheet 3 ft x 8 ft x 0.35 mm	40mm x 40mm x 40mm	8
7	Rotating Shaft	Mild Steel Round Rod 5 mm dia	Length = 150 mm	1
8	Support Rods	Mild Steel Round Rod 3 mm dia	170 (x3), 190 (x2), 130 (x2)	7
9	Slider	Galvanized Iron Sheet 3 ft x 8 ft x 0.35 mm	1000 mm length x 40 mm width x 20 mm side walls	1
10	Handle	Mild Steel Round Rods 20 mm dia. 5 mm dia	Length = 300mm(X 1) Length = 60mm(X 1 )	2
11.	Waterfall Tank	Galvanized Iron Sheet	110mm X 45mm X 40mm Thickness =5mm (17350 cm^2)	1

Density of Mild Steel = 7870 kg/m<sup>3</sup>Total Estimated Weight = **4-5 kg**



Dept.	Technical reference	Created by GAURAV SHARMA 2/8/2023	Approved by
		Document type	Document status
		Title ISOMERTIC DRAWING	DWG No.
Rev.	Date of issue	Sheet	1/1



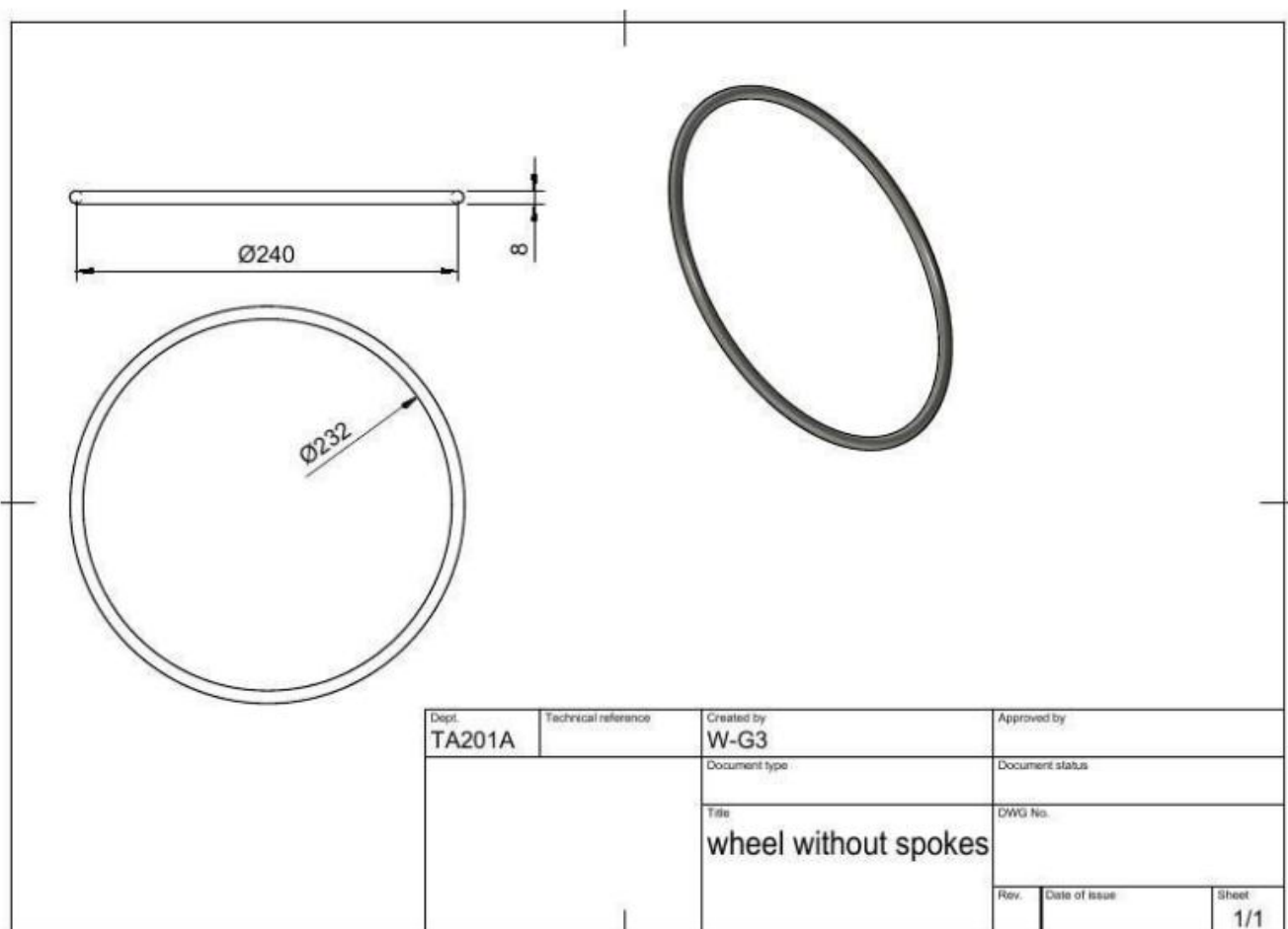
# Parts of Water Lifter

## 1. Wheel without spokes

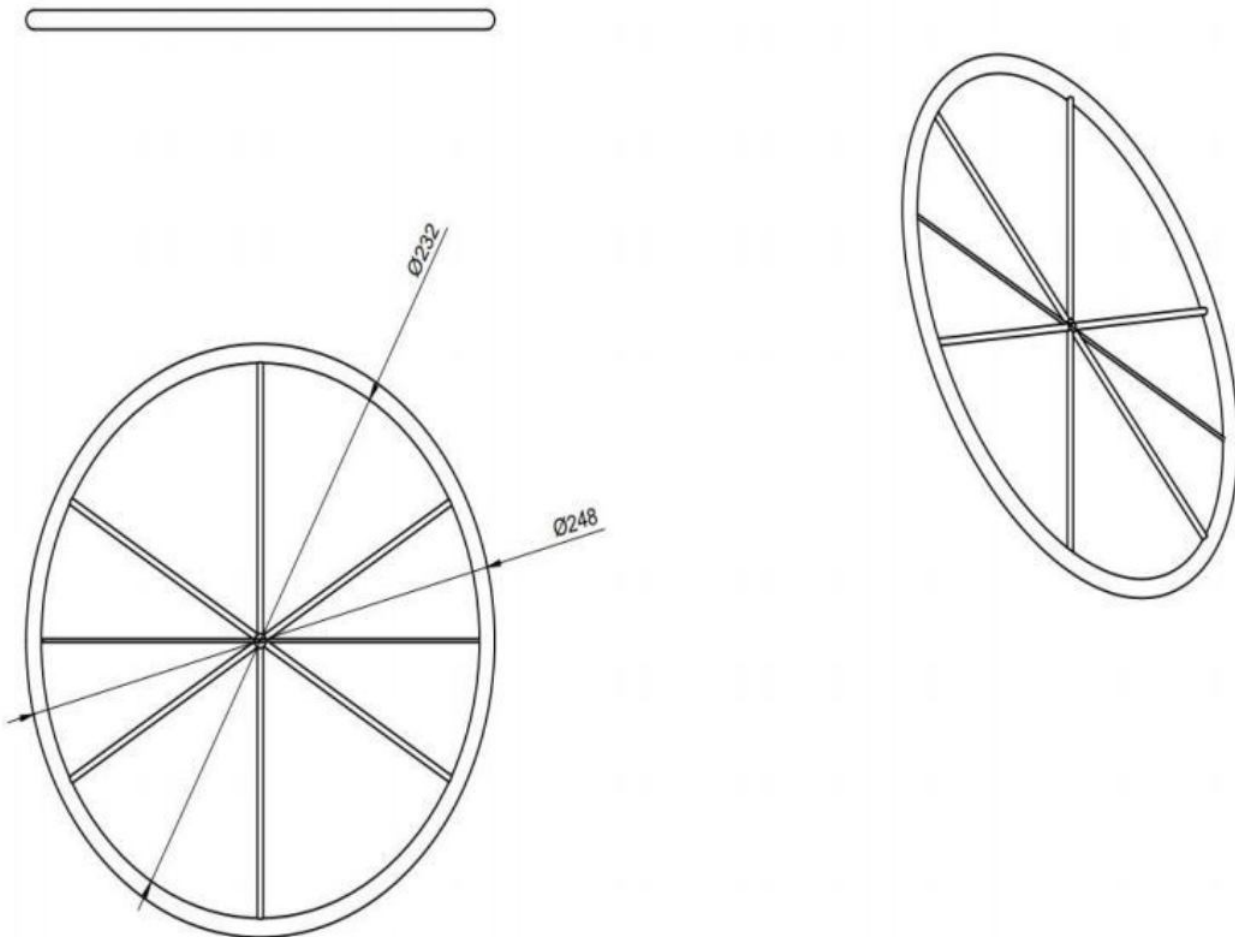
The wheel without spokes part of the water lifter provides the support for the buckets to fit in and give support to the structure and maintain the proper shape.

**Manufacturing method :** It is made of iron by bending of an iron rod of appropriate radius.

**Material required :** The material required is a thin iron rod which can be bent easily, a thick iron rod around which its round shape is given, an anvil to hold the iron rod tight. Therefore Mild Steel rod will be used.



## 2. WHEEL WITH SPOKES

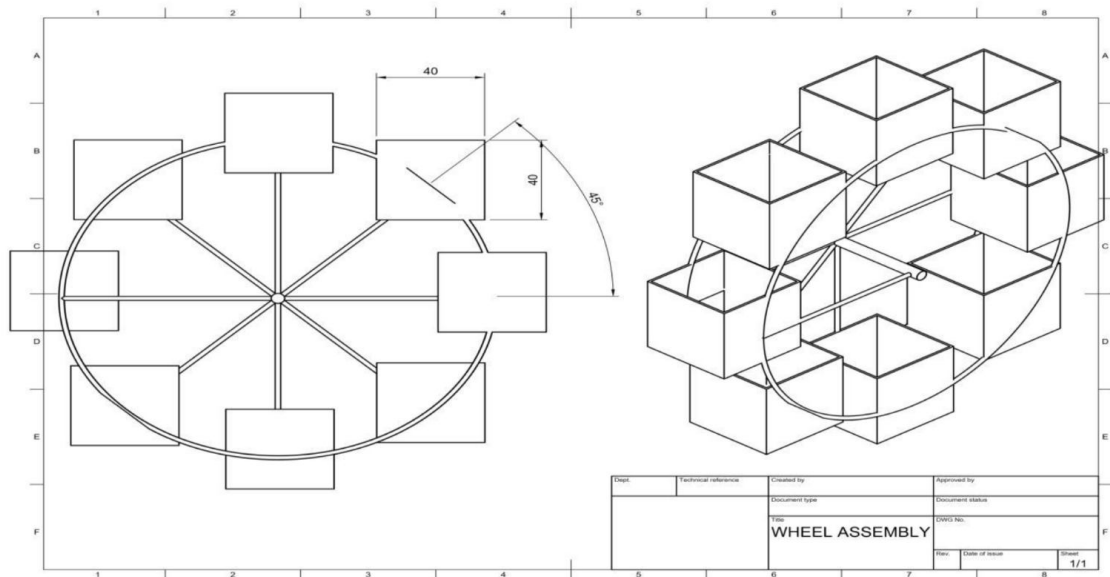


Spokes in ring is used to transfer the loads from wheel to shaft. We are using spokes to provide strength to the system. They will also help in rotating the wheel with the help of shaft.

**Manufacturing Method :** It is made by attaching iron at an angle of 45 degrees with each other to support the buckets.

**Materials Used :** Mild steel round rod.

### 3. WHEEL ASSEMBLY



This assembly will help in lifting the water from tank.

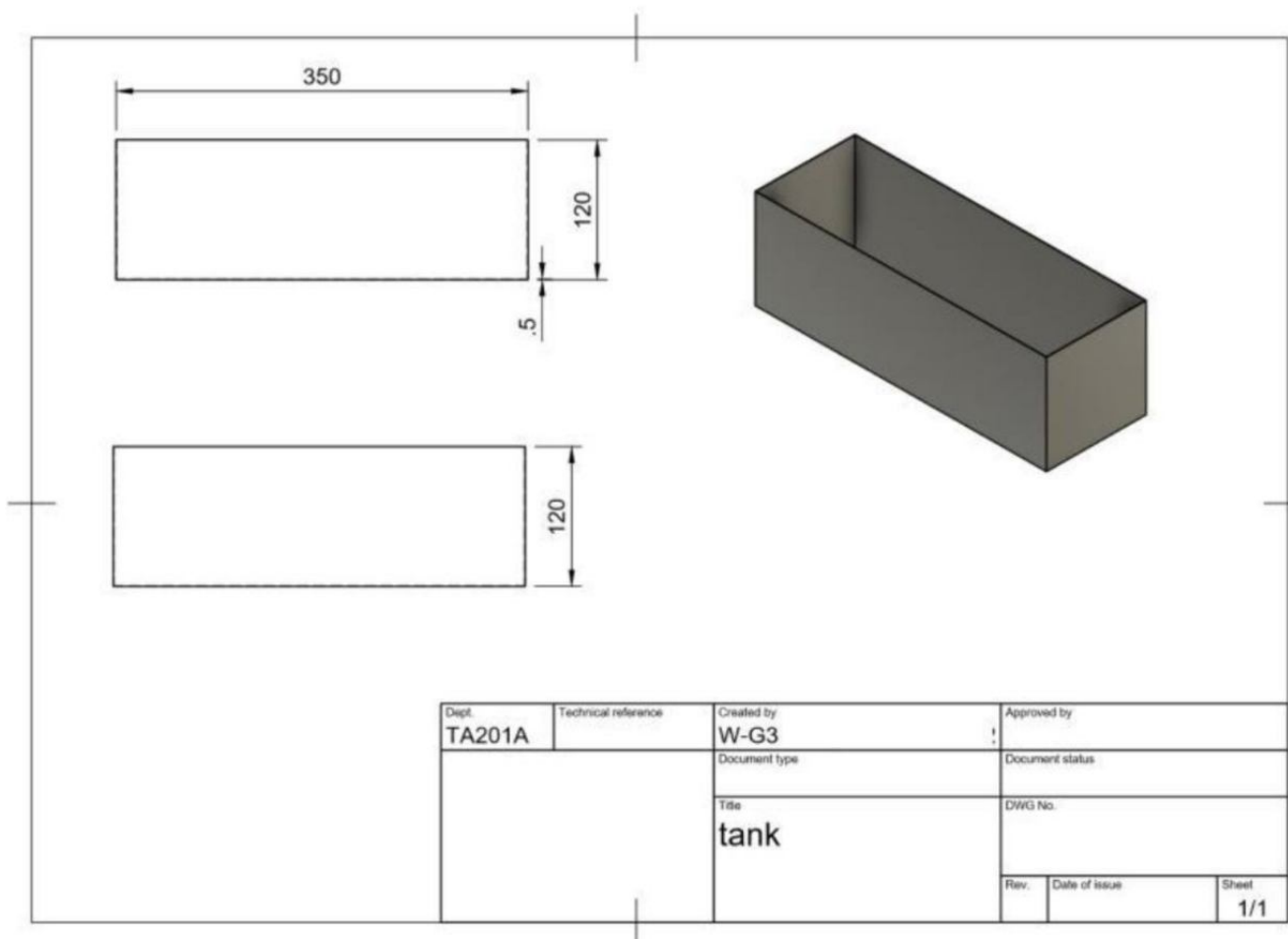
**Manufacturing Method:** Welding is done on the individual parts to make the whole assembly

## 4. Tank

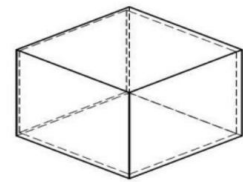
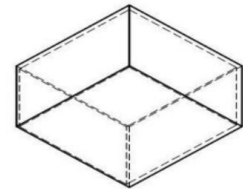
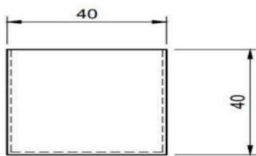
It is the part of the water lifter where all the water from buckets gets collected at once and it is stored for further use.

**Manufacturing method :** The tank is made by using mild steel and forming a tank shape by using tools and welding wherever required.

**Materials required :** For making the tank Mild steel of dimensions 4 ft x 8 ft x 0.5 mm is used to form the tank.



## 5. BUCKET



Buckets hold the water when the wheel is in constant circular motion.

**Manufacturing Method:** Galvanised Iron Sheet is used to form the bucket shape (open rectangular box ).

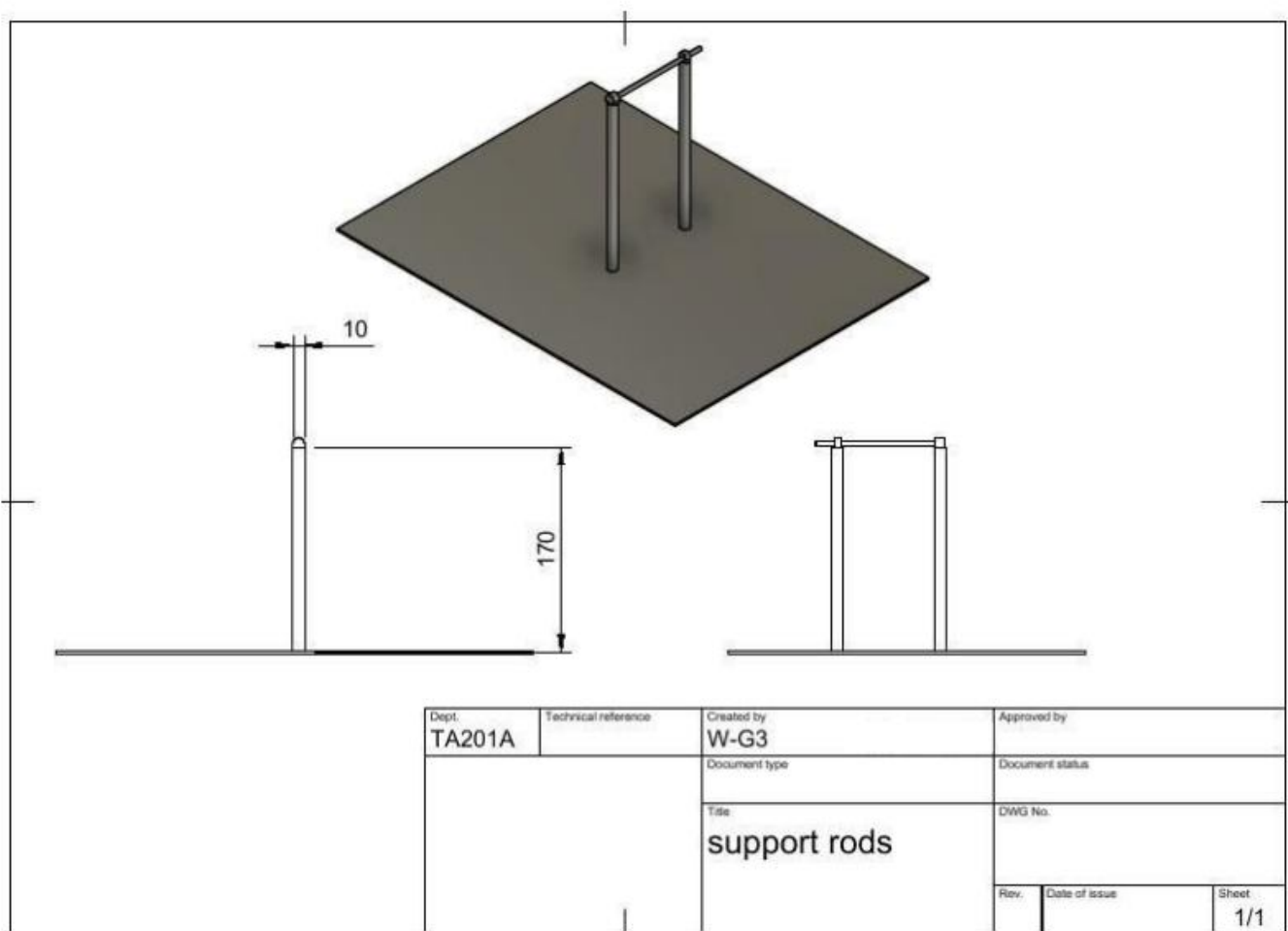
**Materials Required:** Galvanised Iron Sheet

## 6. Support rod

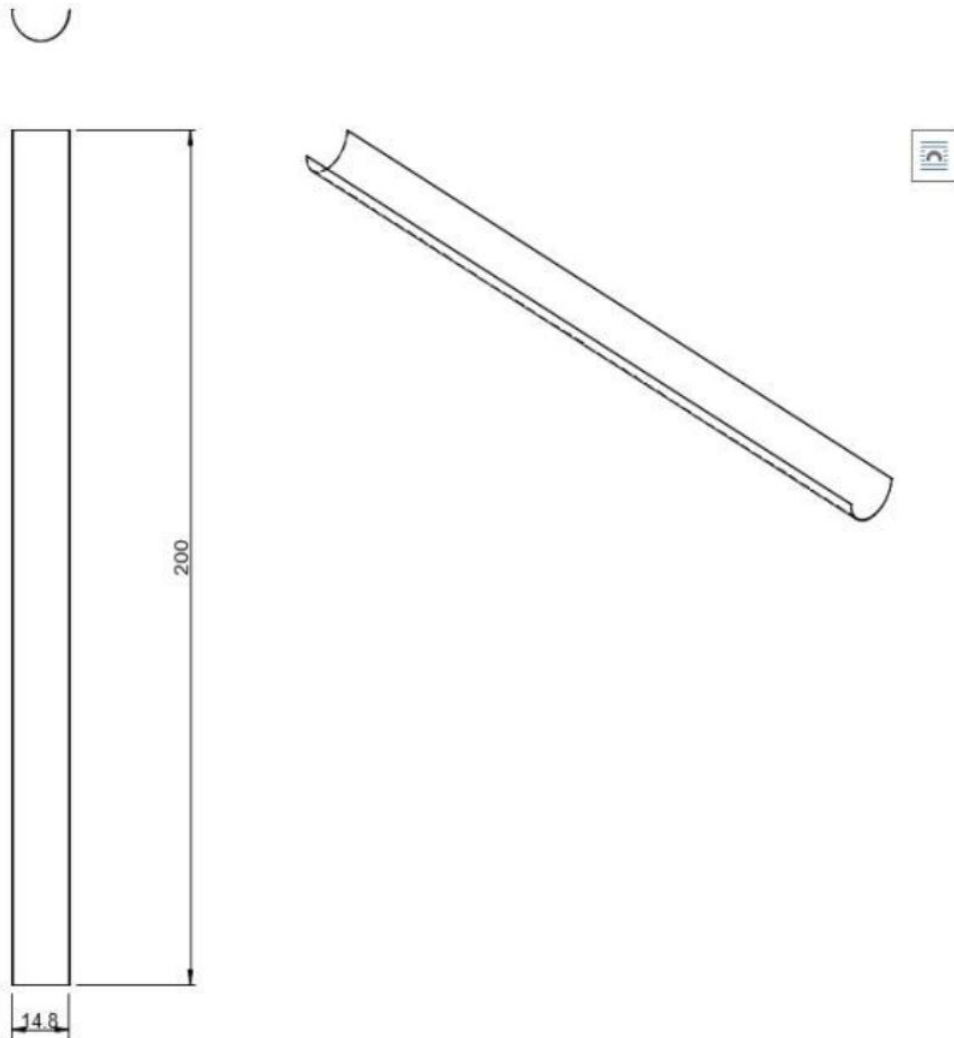
This part is required to provide support to the whole system as the name suggests it also provides the basic part to support the dynamic motion of the system as the shaft is attached to the same.

**Manufacturing process :** It is made by attaching the iron rods to the base of the structure and we have to keep in mind to make it strong as it is the supporting unit of our model

**Materials required :** Mild Steel Round Rod 3 mm diameter is used to manufacture this part.



## 7. SLIDER

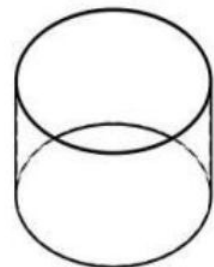
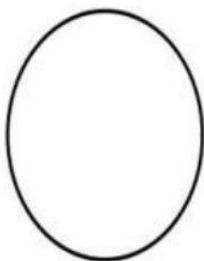
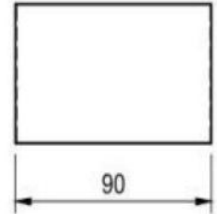


Slider will help the water to slide to the collecting tank.

**Manufacturing Method:** Slider can be made by galvanised Iron sheet using method of sheet metal forming.

**Materials Required:** Galvanised Iron Sheet

## 8. COLLECTING TANK



It is used to collect water coming from slider

**Manufacturing Method:** Galvanised Iron sheet is shaped in the cylindrical shape by brazing the base to form collecting tank .

**Materials Required:** Galvanised Iron Sheet

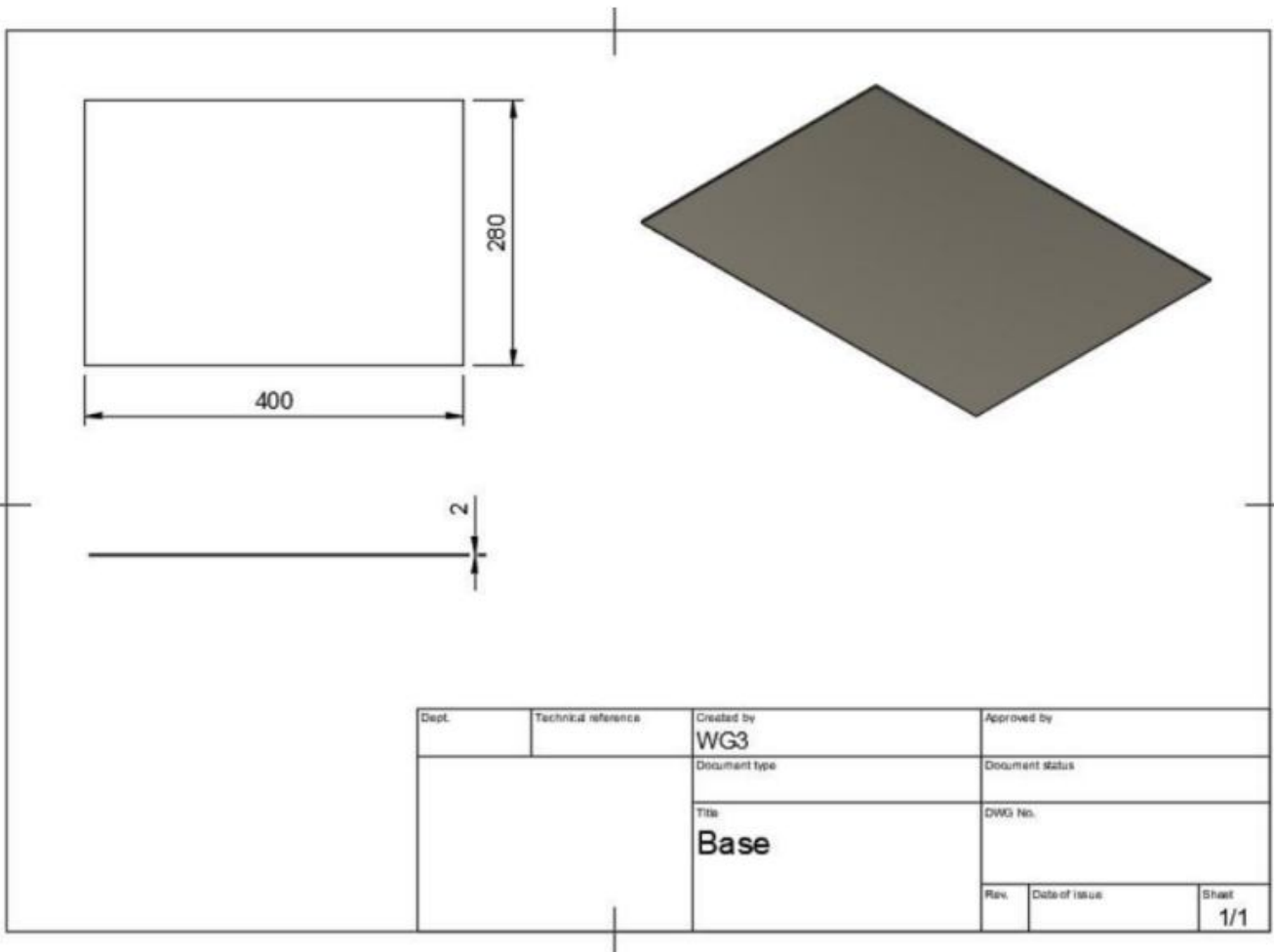


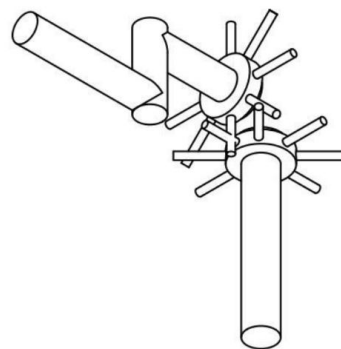
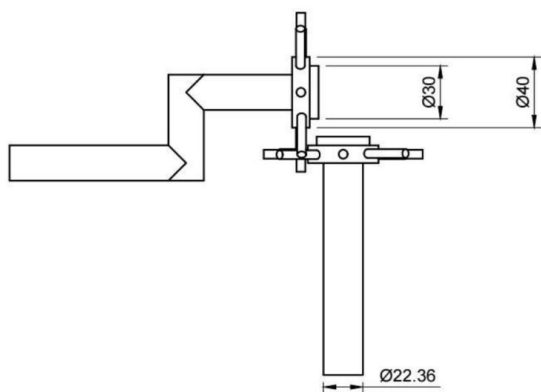
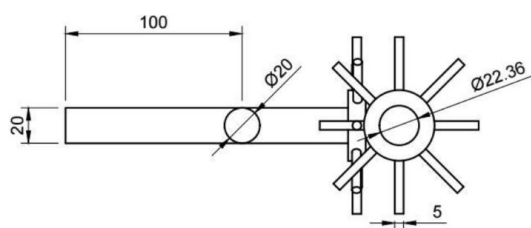
## 9. Base

It is required to hold the complete assembly.

**Manufacturing method :** The base is made by using mild steel sheet.

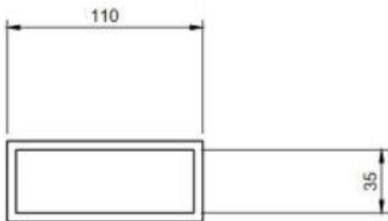
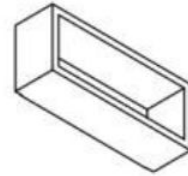
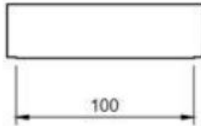
**Material required :** Mild steel sheet.





Dept.	Technical reference	Created by	Approved by
		Document type	Document status
		Title	DWG No.
		<b>HANDLE</b>	
Rev.	Date of issue	Sheet	1/1

## 11. WATERFALL TANK



It is used to collect (temporarily) the water falling from the buckets and pass it to slider .

**Manufacturing Method :** It is made by using mild steel and forming the tank shape by using tools and welding wherever required .

**Materials Required :** Mild Steel