TA201 S1G5 Design Project

Foot Operated Sanitizer Dispenser Stand

GUIDANCE

- **Instructor In-Charge:** Dr. Sudhanshu Shekhar Singh
- **Lab Tutor:** Parmanand Kumar Tyagi
- **TA:** Pritam Ghosh and KM Amita
- **Lab Instructor:** Mr. Anil Kumar Verma

GROUP MEMBERS:

- Bhumik Mehra
- Bhukya Sagar
- Deepanshi Maheshwari
- Devang Kumawat
- Dhwanit
- Kunal
- Rachit Bodhare

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ACKNOWLEDGMENT

We sincerely express our gratitude to our course instructor Dr. Sudhanshu Shekhar Singh, Lab instructor Mr. Anil Kumar Verma, and Teaching assistants Pritam Ghosh and KM Amita for their valuable and constructive suggestions throughout the planning and development of this project.
It was a great experience to work in a team and get highly motivated, criticized, and appreciated simultaneously, which added to making this one of the best learning experiences that eventually catalyzed our personal growth. Without their moral and technical support, we wouldn't have been able to complete this effortful task. Overall, we thank all TA201 staff for providing us with this opportunity to make something creative.

THANK YOU ALL!

MOTIVATION

COVID-19 is a contagious disease and spreads when an individual comes in contact with the infected person. Therefore, It is very important to maintain sanitation facilities. Use of sanitizer increase rapidly during this pandemic.

When we use sanitizer bottle we have to operate it with our hand and this increases the chances of person getting infected through hands. So to have a **cheap, durable and contactless mechanism (foot operated)** we make use of sanitizer stand. The user needs to press the pedal by using his/her foot and place his/her palms in front of the sanitizer bottle. A small amount of sanitizer automatically gets dispensed into the palms of the user on pressing the pedal.

To avoid contact of people using Sanitizer bottle we can make use of sanitizer stand. The purpose of this sanitizer stand is to control the spread of coronavirus from an infected person to others while using the same sanitizer bottle.

TASK TIMELINE

Week	Task Done
1-2	Discussion about different project ideas
3	Finalized Foot Sanitizer design project; Worked upon improvisation
4	Made list of materials required, prepared isometric sketches and complete engineering drawing of our project
5	Prepared the labelled isometric projection along with cost and expenditure analysis and sustainability analysis of our project idea

Work Distribution

Roll No	Name	Week 1 & 2	Week 3	Week 4	Week 5
200274	Bhoye Kunal Dasharath	Proposed an idea & Created ppt on it.	Suggested ideas for improvement to the finalised idea.	Drafted motivation and need of our model.	Worked on improvisations in the report.
200275	Bhukya Sagar	Proposed an idea & Created ppt on it..	Suggested ideas for improvement to the finalised idea.	Prepared work distribution.	Helped in final documentation
200276	Bhumik Mehra	Proposed an idea & Created ppt on it..	Made isometric drawing of complete assembly.	Made isometric drawings of parts.	Worked on improvisations in the report.
200283	Bodhare Rachit Rajendra	Proposed an idea & Created ppt on it..	Prepared the component list of selected idea.	Searched about various manufacturing techniques.	Worked on improvisations in the report.

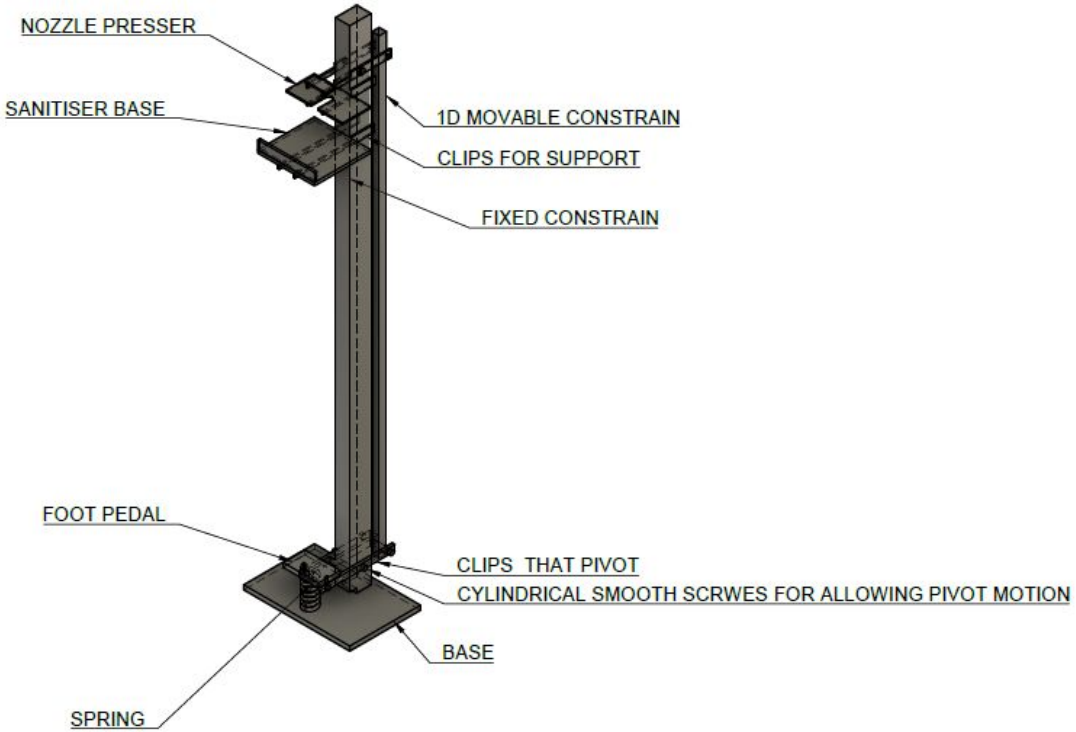
Work Distribution

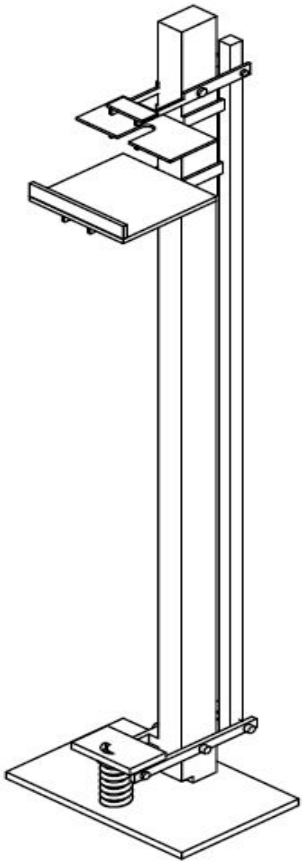
Roll No	Name	Week 1 & 2	Week 3	Week 4	Week 5
200311	Deepanshi Maheshwari	Proposed an idea & Created ppt on it..	Suggested ideas for improvement to the finalised idea.	Arranged the isometric drawings in the presentations	Worked on the final project document and presentation slides
200315	Devang Kumawat	Proposed an idea & Created ppt on it.	Prepared the component list of selected idea.	Drafted acknowledgement and looked upon the quantity of material required.	Worked on the final project document and presentation slides.
200333	Dhwanit Balwani	Proposed an idea & Created ppt on it..	Looked for Improvisations in the Sanitizer Stand and discussed with other members.	Identified and named different parts of the stand in the drawings.	Working on improvisations in the report.

FOOT OPERATED SANITIZER DISPENSER STAND

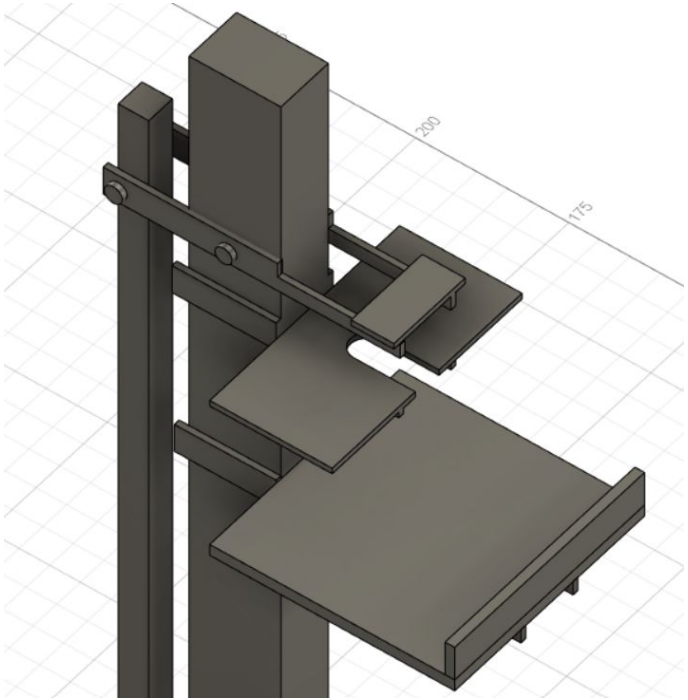
WORKING MODEL

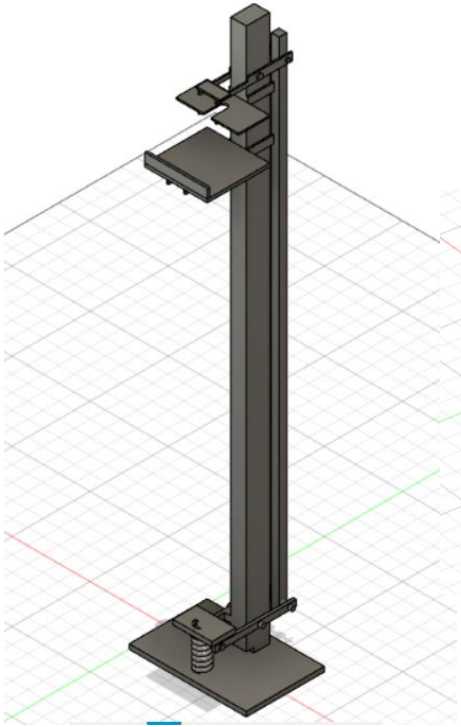
Isometric Drawings

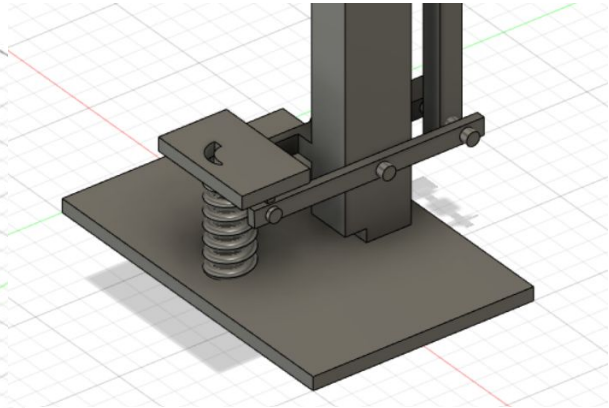




Isometric Drawings

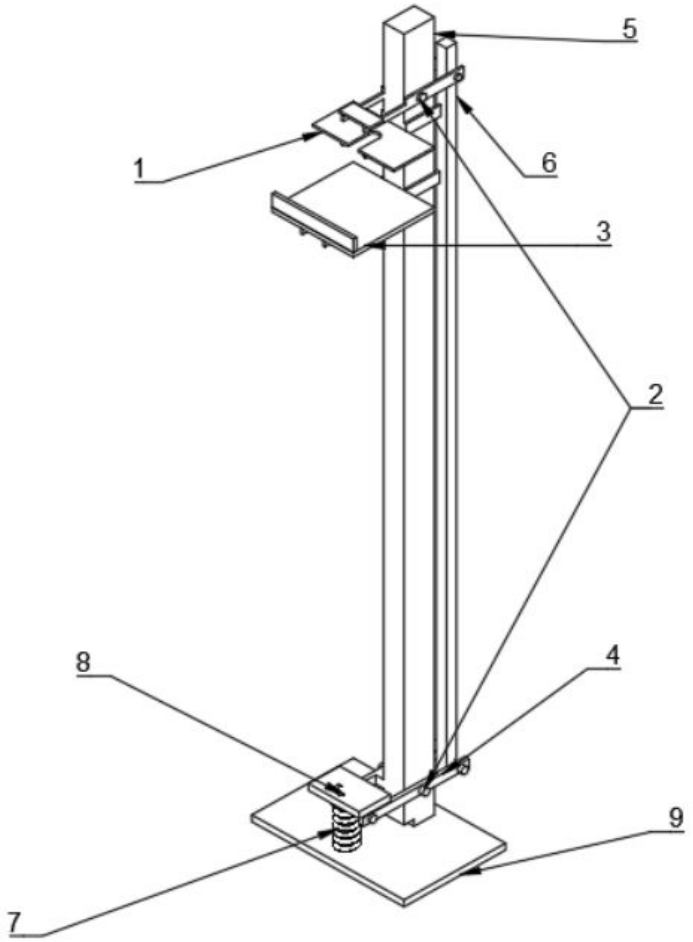




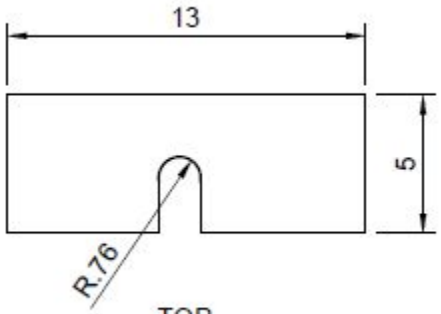


Isometric Drawings

Part Labelling



1. BOTTLE NOZZLE



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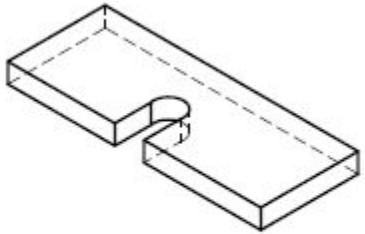

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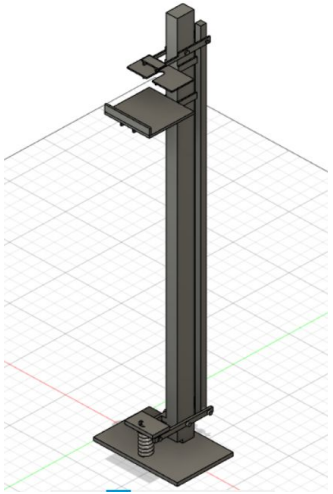
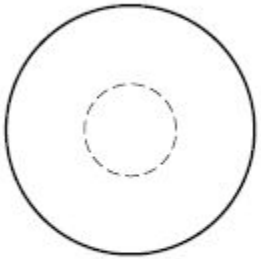


FRONT

Dimensions in mm

2. CLIPS



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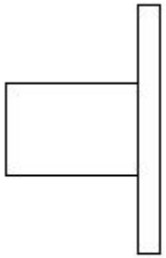

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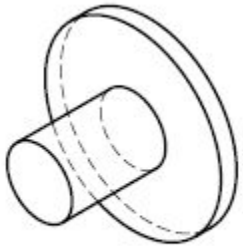

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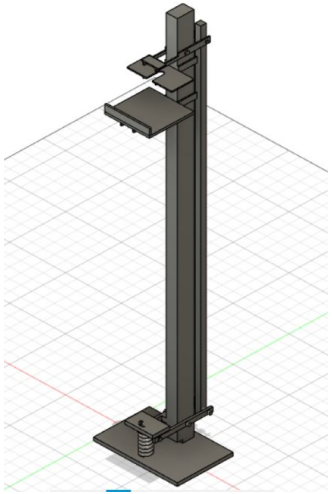
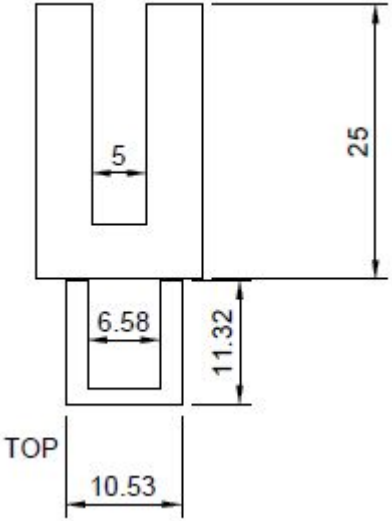
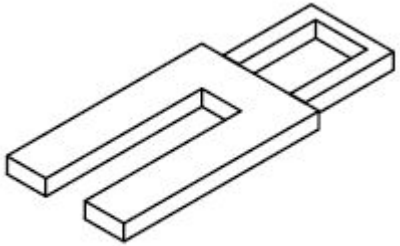
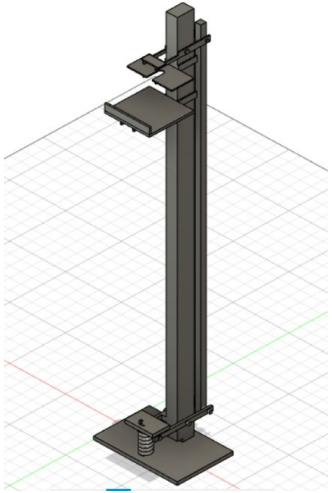


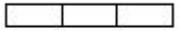
Dimensions in mm

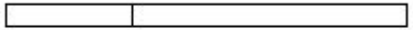
3. BOTTLE SUPPORT





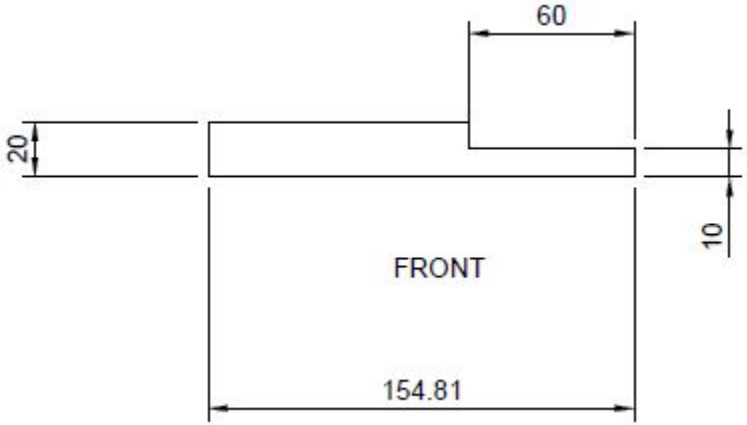


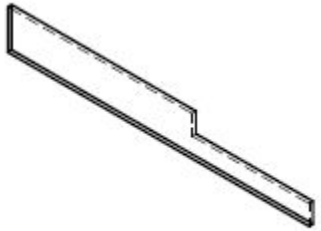




Dimensions in mm

4. HOLDERS





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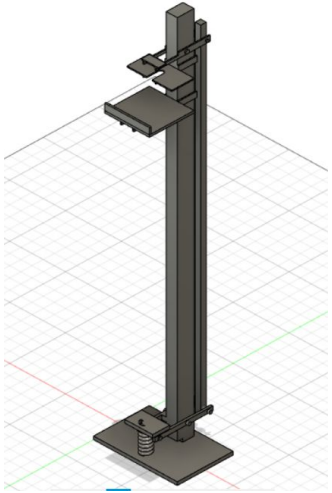
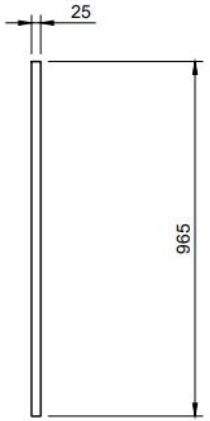


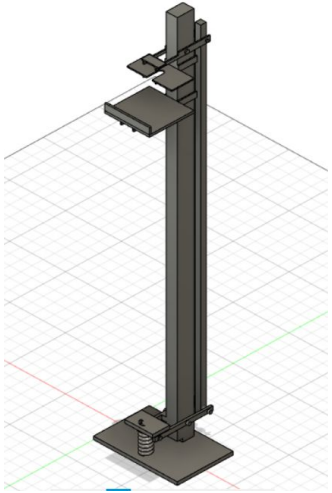
Dimensions in mm

5. FIX BAR



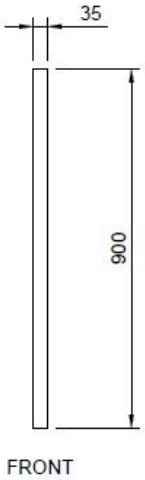
FRONT

ISOMETRIC



Dimensions in mm

6. MOVABLE BAR



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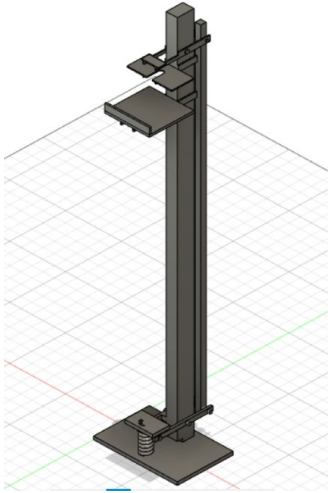
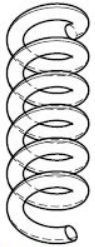


Dimensions in mm

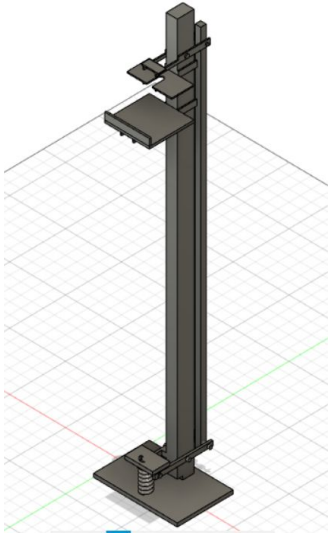
7. COIL



ISOMETRIC

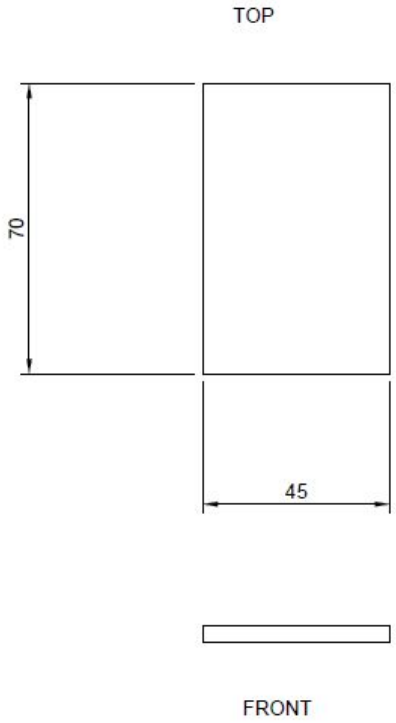
FRONT

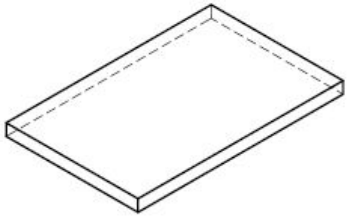
DIAMETER= 80mm,
HEIGHT = 91mm

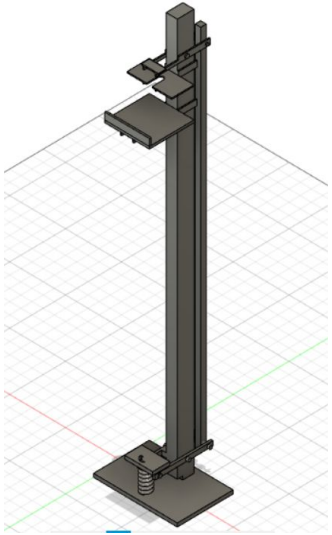


Dimensions in mm

8. FOOT PEDAL

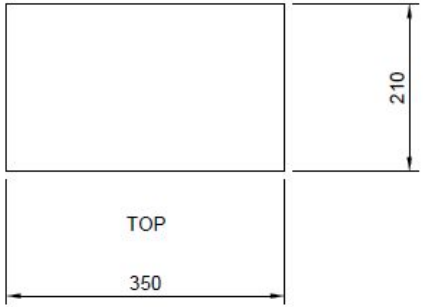


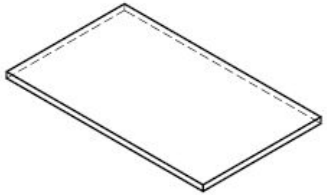




Dimensions in mm

9. BASE





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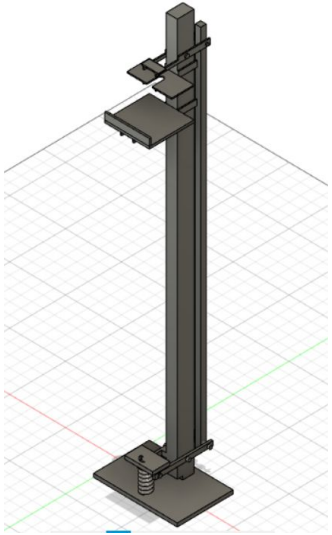

FRONT

RIGHT

Dimensions in mm

MATERIALS REQUIRED

ELEMENT	DIMENSIONS	MATERIAL USED	QUANTITY	MANUFACTURING PROCESS	JOINING PROCESS
MAIN BASE	350 x 210 mm, height= 10mm, thickness=3.46mm	MILD STEEL FLAT	1	CUTTING	BRAZING
FOOT PEDAL	width=46mm, height=2mm, length=70mm	MILD STEEL SQUARE PIPE	1	CUTTING	SCREWS
MOVABLE PIPE	Inner pipe diameter- 19mm, Thickness- 2mm, Length-965mm Outer pipe Diameter: 25.40mm, Thickness: 1.5mm, Length: 910mm	MILD STEEL SQUARE PIPE	1	CUTTING	BRAZING

ELEMENT	DIMENSIONS	MATERIAL USED	QUANTITY	MANUFACTURING PROCESS	JOINING PROCESS
CONSTRAIN PARTS (FIXED+MOVABLE)	110mm*19mm*3mm	MILD STEEL SHEET	1+1	Cutting of pipes according to required dimensions	SCREWS
BOTTLE BASE	100 x 90mm. The wall base is raised to 10mm, thickness=2mm	MILD STEEL SHEET	1	CUTTING	BRAZING
COIL	Diameter- 19mm, Length- 71.5mm	MILD STEEL	1	CUTTING	BRAZING
CLIPS	Per clip: Length- 117mm, Width- 4mm, thickness- 3mm.	MILD STEEL SHEET	10	DRILLING	SCREWS

COST ANALYSIS

Total Cost = Rs 1102/-

Sr. No.	Component	Quantity	Dimensions	Cost (in Rs.)
1	Bottle Nozzle	1	13 x 5 mm	10/-
2	Clips	10	Per clip: 117 x 4 x 3 mm.	7 x 10 = 70/-
3	Bottle Support	1	100 x 90 x 2 mm	12/-
4	Holders	4	200 x 30 mm	10 x 4 = 40/-
5 & 6	Constraint parts (Pipes/ Bar)	1 fixed+ 1 movable	Fixed: L=965mm D=25mm Movable: L=900mm D=35mm	400/- 300/-
7	Coil / Spring	1	D = 80 mm, H = 91 mm	80/-
8	Foot Pedal	1	70 x 45 mm	50/-
9	Main Base	1	350 x 210 mm	140/-

MANUFACTURING PROCESS

1. Hot Rolling

In metalworking, rolling is a metal forming process in which metal stock is passed through one or more pairs of rolls to reduce the thickness, to make the thickness uniform, and/or to impart a desired mechanical property. Hot rolling is a metal working process in which metal is heated above the recrystallization temperature to plastically deform it in the working or rolling operation.

Hot rolling used in our project is for making base since Hot Rolled Metal Sheet requires less processing and results in high strength.

2. Cold Rolling

In this process metal is passed through rollers below its recrystallization temperature.Cold rolling is a technique where a metal strip or sheet is passed between two rollers and then squeezed and compressed. The level of strain present determines the properties and hardness of the finished material.

We used pedal in making foot pedal.

3. Annealing

Annealing is a heat treatment process that alters the physical and sometimes chemical properties of a material to increase its ductility and reduce its hardness, making it more workable. It involves heating a material above its recrystallization temperature, maintaining a suitable temperature for an appropriate amount of time and then cooling.In the inner fixed and outer movable pipe with top constraint part , all pipes are made by cold rolling followed by annealing.

4. Forming

Forming is a mechanical process of fashioning metal parts and objects through mechanical deformation; the workpiece is reshaped without adding or removing material, and its mass remains unchanged. Forming operates on the principle of plastic deformation where the physical shape of the material is permanently deformed. For Sanitizer bottle base, the forming process will be used to bend the walls so that sanitizer bottle don’t falls from it.

5. Brazing

In this process metal parts to be joined are heated to a temperature below the melting point of the parts but sufficient to melt the lower fusion point filler material which is used to fill the gap at the joint and establish a bond between the edges through the filler material. The outer adjustable ring type structure in the sanitiser bottle base would be joined to the back wall by brazing it.

6. Drilling

Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. Holes would be drilled in the sanitiser bottle base to fit a screw for the height adjustment mechanism. Also in Clips, two sheet metal pieces will be cut and will be made round on the edges on one side. A hole will be drilled on the other end to fit the pivot piece.

SUSTAINABILITY ANALYSIS

- Since steel is the most sustainable material, we had used this in our Design project. Adding to the environment friendly characteristics it has long durability and longevity.

- Seeing the previous year data approximately 1.85 tonnes of CO_2 of were emitted for every tonne of steel produced. Steel is environment conscious hence has has low manufacturing emissions when compared to low density materials such as aluminium and carbon fibre. It has also recycling properties which enable us to use the material again.

- Sanitiser bottles used are primarily plastic based, which is non-recyclable and not good for sustainability point of view. In order to tackle this problem, we can use aluminium or stainless steel refillable bottles.

- Since the main problem was to minimize contact of the user, with this concept it became very easy.

SUMMARY OF THE PROJECT

The foot operated sanitizer stand is a device which dispenses only a controlled amount of hand sanitizer . They are available in different sizes, price ranges, operation modes, and capacities. They are installed in public places and washrooms. They are user friendly and cost effective with lower maintenance costs.

- **100% Touchless foot pedal stand.** It with an easy to use foot pedal that allows you to apply sanitizer without the compulsion of touching the bottle or the stand. explains how to **disinfect your hands correctly,** reducing the spread of germs . Helps to keep a **workplace more hygienic**, cleaner and healthier. Suitable for any environment.
- According to different needs using the different sizes of sanitizer bottles, the sanitizer stand shaft is **fully adjustable** to fit most bottle sizes especially large ones according to the need of the place .

THANK YOU!