

3D Modeling and Fabrication of Seed Sowing Equipment

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Abstract:

In the construction of a mechanically propelled agricultural machine that uses human force to flatten, sow, and plough among other agricultural tasks. The process of ploughing involves lowering the frame, which in turn lowers the associated plougher to the ground. The seeds from the cone will travel via the narrow passageway provided by a pipe when the cylinder rotates during sowing. After the sowing mechanism, the land is flattened to cover the seeds. Human power is used to operate and move all machinery and vehicles.

Keywords: Agriculture, seed sowing, design, fabrication.

I. INTRODUCTION

Agribusiness has been the cornerstone of the Indian economy and will continue to be for some time. A man without food for three days will quarrel, a guy without food for seven days will fight, and a man without food for about a month will perish. Applied science includes horticulture. The science and art of growing, including preparing the soil, increasing harvests, and keeping domestic animals, is known as agribusiness. The biggest project ever undertaken is this one. Long-term agricultural techniques have been carried out by smallholders who cultivate between 2 and 3 hectares, using human labour and traditional tools like wooden furrows, burdens, levellers, harrows, mallets, spades, large sickles, and so on

FEATURES OF INDIAN AGRICULTURE

Wellspring of business: Agriculture is the fundamental occupation. It gives work to almost 61% people of all out populace. It contributes 25% to public pay. • Dependence on rainstorm • Labor escalated development • Under business • Small

size of possessions • Traditional strategies for creation • Low Agricultural creation • Dominance of food crop

Comparison

	Conventional method	Automated method	Mechanical method
Labour cost	High cost	Less cost	Less cost
Cost	Medium	High	Less
Time	High	Less	Less
Maintenance cost	Less	High	Less
Seed sowing method	Manually by hand	Easily by automated	Easily

II. DESIGN AND FABRICATION

ELEMENTS THAT INFLUENCED DESIGN AND FABRICATION

- Scientific cultivating strategies
- Eco amicable
- Precision cultivating
- Our vehicle is totally adaptable for simple gathering and dismantling.
- Comparative Low expense

A. Choice of material

Mild steel: It is the most ordinarily utilized steel. It is utilized in the ventures too in the diverse regular items we use. Indeed, even the dish and spoons of the kitchen are here and there made of gentle steel. The primary objective of this article is to examine about various mellow steel properties. The gentle steel is significant in the assembling of metal things

SPECIFICATION

a) Cylinder daimeter	0.1718	m
b) Cylinder length	0.810	m
c) Cone diameter	0.1016	m
d) Cone height	0.1016	m
e) Seed sowing pipe diameter	0.0127	m
f) Frame front length	1.120	m
g) Frame side length	0.610	m
h) Shaft diameter	0.254	m
i) Wheel diameter	0.3556	m
j) Distance from frame to ground	0.100	m
k) Diameter of wheel	0.3556	m
l) Weight of the cylinder	7	kg
m) Weight of the frame	6	kg
n) Weight of cylinder with frame and wheel	10	kg
o) Overall weight of the equipment	17	kg

Table 2

COMPONENTS OF THE EQUIPMENT

a. Chassis: A counterfeit item's body is the framework that guides the creation and application of the item. An example of a body is the underneath of a vehicle, which is where the body is mounted. Light steel is used to create the edge.

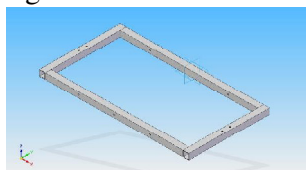


Fig 1



Fig 2

b. Cylinder The main component, which is an empty chamber with compartments on it for the cones to be placed in, is where the seeds are placed inside a container. The chamber measures 177.8 mm in width and 810 mm in length.

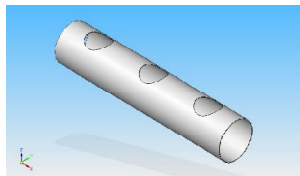


Fig 3

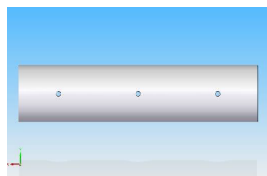


Fig 4



Fig 5

c. Wheel: The wheel is connected to the principle motion by a free wheel, and as a result, it is connected to the chamber; when the wheel moves ahead, the chamber rotates in a clockwise direction. The "external edge of a wheel, holding the tyre" is referred to as the wheel edge. It is part of the wheel's exterior roundabout design, which is where the inside tyre edge is mounted on vehicles like automobiles. For instance, the edge of a bicycle wheel, which supports the tyre, is a sizable circle connected to the spokes' external closures. The tubeless wheel we used for our gear has an exterior dimension of 406.4mm and an internal width of 355.6mm.



Fig 6



Fig 7

d Free wheel: A freewheel or invading grip is a device in a gearbox that separates the driveshaft from the determined shaft when the determined shaft turns more quickly than the driveshaft, according to mechanical or automotive design. Occasionally referred to incorrectly as a freewheel, an overdrive is typically detached. The freewheel is really connected to the wheel; as the wheel moves forward, the freewheel spins alongside it, pivoting the chamber; when the wheel moves backward, the chamber remains steady but the wheel turns.



Fig 7



Fig 8

e. Path provider: A path provider is a tool or ranch implement used in cultivating to start soil development prior to planting seed or other vegetation. Three plougher teeth are attached to the housing of this gear using screws and nuts. Each furrow tooth measures 177.8 mm in length. Mellow steel has been used as the material.



Fig 9



Fig 10

f. Flatter: The lever is a tool used to level the field once planting and furrowing are complete. The leveler is connected to the edge in this device with the aid of screws and nuts. The complement measures 127mm long. Mellow steel has been used as the material.



Fig 11



Fig 12

g. Cone: A mathematical cone is a three-dimensional structure that easily constricts from a flat base to a point known as the zenith or vertex. This piece of hardware has a cone attached to a chamber with sections; the cone is filled with seeds and sealed at the top. The cone's length is 101.6 mm; the measurement is 101.6 mm. Steel that has been hardened was used to make the cone.

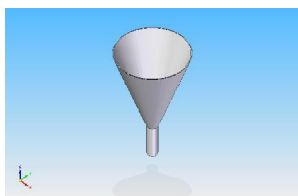


Fig 13



Fig 14

ASSEMBLY OF SEED SOWING EQUIPMENT

The above parts demonstrated are collected and manufactured to get last gathering of precisely worked seed planting hardware.



Fig 15



Fig 16

3. WORKING

The objective behind this project is to provide ranchers with multipurpose vehicles that carry out all the rational cultivating decisions and innovation to acquire the highest yield and best-quality crops while reducing investment and labour requirements. For more than five sections of land of land, there are several work vehicles operated tools that are appropriate and conservative. There are various hand-operated equipment types that are just appropriate for cultivating logic. Our goal is to create a solar-powered agricultural vehicle that is suitable for 1 to 3 sections of land. It is both traditional and modern, and it uses rational tactics. the majority of Indian formers are theproprietors of one to three land parcels. As a result, it often fits with Indian economic and agricultural practices.

Formulas Used And Calculations.

As appeared beneath these are the information gathered and the equation utilized for the investigation of various undertaking boundaries. parameters.

Formulas:-

- a. Volume of cone = $(\pi r^2)h/3$
- b. Efficiency = output/input = (pqql)/Supply load
- c. Total length of sowing = Length between 2 consecutive seeds * No of seeds
- d. Overall length of flow = Total length of sowing * No of cones
- e. Rate of flow/sow = volume/time.

Observation

- Distance between the seeds 0.710 m
- Time of the seed to be sowed 2 seconds

Radial column:

Diameter of pipe in m	Radius of cone in m	Time in seconds	Length($\pi r d$) in m
0.0127	0.0508	2	0.319185

Calculation

- a. Volume of the cone = $(\pi * 0.0508 * 0.0508 * 0.0508) / 3$ = 0.0001373 m-cube.
- b. Efficiency = $(0.195 / 0.0001373)$ = 1420.25 kg/m³ one cone.
- c. Total length of sowing = 165 feet.
- d. Overall length of flow = $165 * 3$ = 495 feet/sow.
- e. Rate of flow/sow = $0.0001373 / 2$ = 0.00000572.
- f. Rate of sowing = 240 seconds.
- g. Distance between consecutive seeds = 0.600 m.
- h. Overall rate of flow = 240 seconds

Results

Volume in m-cube	Rate of flow (Q) in m-cube/sec	Length of sow in m	Efficiency in %
0.0001373	0.00000572	0.4572	56%

Table 4

UTILIZATION OF OUR EQUIPMENT

- Sowing of seeds.
- Flattering.

POINTS OF INTEREST OF OUR EQUIPMENT

- Includes logical shaping methods. Grouping separating seed planting machine has a larger number of points of interest than standard seed planting machine.
- Low Cost-It's the most reduced estimated multipurpose rural hardware ever manufactured.
- Initial speculation is less and support free.
- Number of laborers required is diminished unreasonably, which thusly lessens work charges.
- Reduces time utilizations.
- Our hardware is totally adaptable for simply get together and dismantling.
- No additional force source is needed to run this hardware.
- In future this hardware can be fixed to farm hauler following plougher so that planting and furrowing should be possible parallelly

DISADVANTAGES OF OUR EQUIPMENT

- Not ready to use in wet land.
- Dibbling measure isn't possible utilizing this hardware.
- Simultaneously preparing isn't possible while planting.

4. CONCLUSION

Our group has effectively joined numerous thoughts from different fields of mechanical designing and horticultural information to decrease the work exertion and costs. The entire thought of seed planting gear vehicle is another idea, patentable and can be effectively execute, all things considered, circumstances.

- a) The gear is intended for the complete volume of 137.3cm³.
- b) The all-out release of the hardware is 0.572m³/s.
- c) The length of sow per filling is 45.72cm.
- d) The proficiency of the model is 56%.

5. SCOPE OF IMPROVEMENT

- By expanding the Vehicle quality and quality to its pinnacle, we can have multipurpose horde
- By giving rigging game plans and some minor changes the hardware can likewise be made as work vehicle ecocultural vehicle forever time use. trolled gear.
- The planting instrument can be executed to perform seed planting, permitting the seeds to fall soon after the furrowing cycle

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