

Manually Operated Seed Sowing Machine

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Abstract

The aims of the product improve mechanical equipment used in agriculture by reducing the amount and kind of labor required to produce a single crop. As a result, we made the decision to develop and construct a machine for small-scale producers that will be affordable and capable of lowering costs while increasing profits for farmers as part of this project. The primary advantage of this idea is that cotton seed can be easily sown. The agricultural industry needs to come up with alternatives to outdated farming methods and replace them with ones that are more effective. We attempted to develop and construct a machine in this project that would lower the goal energy input more effectively than in the past. Small-scale farming really benefits from this strategy. We can now transition to a new equipment generation. We now have the chance to create a new line of agriculture equipment based on small, intelligent machines that can act appropriately in the appropriate context at the appropriate moment. This is made possible by the development of autonomous system architecture. It will boost productivity and cut costs in the agricultural sector.

1. Introduction

Indian economy is based on agriculture. Cropping is important and tedious activity for any farmer, and for large scale this activity is so lengthy also it needs more workers. Thus agriculture machines were developed to simplify the human efforts. In manual method of seed planting, we get results such as low seed placement, less spacing efficiencies and serious back ache for the farmer. This also limited the size of field that can be planted. Hence for achieving best performance from a seed planter, the above limits should be optimized. Thus need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops. Development in agriculture leads to raise economic status of country. In India farmers are facing problems due to unavailability of labors, traditional way of farming using non efficient farming equipment which takes lot of time and also increases labor cost. This is all about enhancement in seed sowing and fertilizer like farming operations by using manual operated seed sowing machine. The main objective of sowing operation is to place seed at proper position respective of other placed seeds in every row at particular depth. As per change in shape and size of different seeds the parameters like distance between two seed, depth of seed, planting rate changes.

2. Literature review

The review by D. Ramesh and H. P. Girish Kumar provides a summary of the numerous sorts of advances made to seed sowing machinery. The primary Goal of a sowing operation is to arrange the seeds in rows at the correct depth and seed-to-seed spacing, cover the seeds with soil, and apply the proper Compaction over the seeds. For each crop and for various agro-climatic conditions, variable row-to-row spacing, seed rates, seed-to-seed spacing, and Depth of seed placement are advised in order to produce the highest yields. Devices for sowing seeds are widely used in agriculture.

According to Pranil V. Sawalakhe and colleagues ,all sectors, including the agriculture sector, are growing quickly in the modern era. Farmers must Adopt new practises that won't alter the soil's texture but will boost crop productivity overall in order to fulfill future food demands. The numerous seed Sowing and seed placement techniques utilized in India are the subject of this essay.

According to Laukik P. Raut and colleagues' research, agriculture must be modernized in order to fulfill the demands of an expanding population and a Rapidly industrializing world. Mechanization makes it possible to conserve inputs by providing accurate metering distribution, lowering the amount Required for a better response, and preventing losses or wastage of applied inputs. Through increased productivity and input conservation, mechanization Lowers the production unit cost.

3. Objective of project work

Use The main objective of "Manually Operated Seed Sowing machine" is to reduce serious back ache problem in hand sowing for the farmer which limits the size of field that can be planted as well as manpower required for planting. Peasant farmers will benefit greatly from this project. In this machine we are going to use two seed sowing wheels along with seed metering mechanism which sows the seeds at equal distance and Which are mounted on axle. Hopper is used for storing seeds. Both manual and towing operation are options for this device.

- To manufacture seed sowing machine which can be operated by the single operator.
- To make the seed dispensing wheel interchangeable for sowing multiple variety of seeds.
- To make this machine as lightweight and inexpensive as possible.

4. Methodology

- The first step is to visit the farmers and learn about their issues.
- Selecting a problem is the next stage.
- Finding a solution to the issue is the third phase.
- The fourth stage is choosing the gear design for the correct seed distance.
- Finding the most appropriate method at the lowest cost is the fifth phase.
- Finding all of the necessary components in the right dimensions is the sixth phase.
- The beginning of fabrication is the seventh phase.
- Testing the machine is the final phase.

I. COMPONENTS USED

Chain : The type of chain drive most frequently used for mechanical power transmission on a variety of home, industrial and agricultural machinery, Including conveyors, wire- and tube-drawing machines, printing presses, cars, motorcycles and bicycles, is roller chain or bush roller chain. It is made up Of several short cylindrical rollers connected by side links. It is propelled by a sprocket, a wheel with teeth. It is a straightforward, dependable, and Effective method of transmitting power. Tensile strength is the most popular way to assess the toughness of roller chains. A chain's tensile strength Indicates how much strain it can sustain before bending under a single load. The fatigue strength of a chain is as crucial to tensile strength.



Fig. Chain & sprocket

Ground Wheel: A pair of idler wheels on either side aid in the precise adjustment of seed placing depth while the ground wheel supplies the necessary power for the seed metering mechanism to function. To raise and lower the ground wheel during turns, a lever mechanism is also available. The tool is easily towed by a pair of bullocks. Mild steel is used for the grinding wheel. The seed metering mechanism and ground wheel are re connected and are

located at the box's base. Seed metering is the process that extracts seeds from the seed box and places them in the In seed tube.



Fig. Wheel

Hopper: A squared shape box which is placed on the upper side of the sowing machine. Hopper is used to store the seeds. The storing capacity of Hopper may vary according to the requirement.



Fig. Hopper

Seed Dispenser : An agricultural tool called a seed dispenser is used to plant seeds for crops by placing them in the ground and burying them to a Predetermined depth. This guarantees that seeds will be dispersed uniformly

Plough: A plough is a farm instrument used to turn or soften the soil before to planting or spreading seeds. Traditionally, horses



and oxen pulled the Plough. A blade linked to a wooden, iron, or steel frame is what a plough uses to cut and loosen dirt. It has been essential to farming for the majority of Time. Ploughs are primarily used to turn over the top soil, bringing new nutrients to the surface while burying weeds and crop residue for later Decomposition.



Fig. Plough

Working of the project

Wheel size	16 inch
Blade Size	12 inch
Box Size/ Hopper Size (LxWxH)	23×18×25
Weight	8kg



Fig. seed sowing machine

The wheel rotates as the machine is pulled forward by the handles, and the gear located on the wheel's axle also begins to rotate. This rotation is then sent To the pinion through the chain drive. After that, the dispenser rotates after receiving the rotating motion. The quantity of seed to be delivered and the Spacing between the seeds are determined by the number of groves on the dispenser wheel. Using a pipe, the seed is now properly dropped into the narrow Trench. When the seed is sown, it falls into the funnel, travels through the pipe, and finally lands in the trench. The seed used can be changed on the seed Distributing wheel. After the seed has been sown, it must now be covered. The soil covering bar is attached behind the machine and is simply dragged Over the narrow trench. This completes the operation by covering the trench with soil.

5. Calculation of sowing machine

- Sprocket ratio of wheel and dispensing wheel is 1:1 .Therefore, when wheel completes one rotation the dispensing wheel also completes one rotation
- For demonstration purpose we are using dispensing wheel of groundnut seed Circumference of wheel= $2 * \pi * r = 2 * 3.14 * 20.4 = 128.11\text{cm}$. Therefore, when the wheel completes one rotation 128.11cm is covered on ground
- The seed spacing for groundnut is 15cm. Number of groves on the wheel(dispensing wheel)=Circumference/seed spacing = $128.11/15 = 8$.Therefore 8 Groves are required for groundnut.
- The seed spacing for mustard is 16cm. Number of groves on the wheel =Circumference of wheel/seed spacing = $128.11/16 = 8$. Therefore 8 groves are required for mustard
- Hopper Size (LxWxH)= $58.42 * 45.72 * 63.5 = 169606.112\text{cm}$

6. Advantage

1. It reduces labor expenses.
2. It reduces operational time and money compared to the traditional way of using a behind-the-field plough.
3. It weighs less than similar devices on the market.
4. It cut the utilization of human labor by 50%.
5. Because it is less expensive, even peasant farmers can get these contemporary gadgets.
6. As soon as the plough touches the ground, seeds begin to fall to the ground automatically.
7. It can also be utilised for different seed

7. Disadvantages

1. IN HARD SOIL, THE MACHINE REQUIRES MORE FORCE.
2. DIFFERENT PEOPLE USE DIFFERENT AMOUNTS OF FORCE

8. Result

In This Project We Have To Take The Reading That Is How Much Time Is To Be Required To Feed Seeds In Hopper.

THE NORMAL SPEED OF HUMAN BEINGS IS 2.5KM/HR.

THEREFORE, SPEED OF MACHINE = 2.5 KM/HR = 0.7 M/S.

NO. OF REVOLUTIONS PER MINUTE, $N = \text{SPEED (M/S)} * 1000 / (\pi * 60)$

$N = 3.71 \text{ RPM}$

$N \approx 4 \text{ RPM}$

As Wheel Has 8 Sides, So In 1 Revolution It Can Sow 8 Seeds. Therefore No. Of Seeds Sown Per Minute = $8 * 4 = 32 \text{ SEEDS}$.

9. Conclusion

Proposed seed sowing machine will be fulfilled need of a poor and small land farmer. They can easily and effectively plants their seed in the field by these planters. But due to different crops have different requirement for the seed planting in the field. So the usefulness of the single seed planter is limited. Hence, the requirement of the manually operated multi seed planter is very high. In this, design and fabrication of a manually operated seed sowing machine is done. It is found that fabricated machine is cheap, easily affordable, easy to maintain and less laborious to use. The machine will go a long way in making farming more attractive and increasing agricultural output.

10. Reference

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