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Design and Fabrication of Tractor Mounted Drum Seeder

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Abstract

The tractor mounted drum seeder is an efficient agricultural implement designed for uniform sowing of pre-germinated seeds, especially in wetland paddy fields. The main objective of this project is to design and fabricate a cost-effective, time-saving, and labor-reducing seeding machine that can be easily attached to a tractor. The system consists of seed drums with perforations, a supporting frame, ground wheels, power transmission mechanism, and hitching arrangement. When the tractor moves, the ground wheel rotates the drum, allowing seeds to fall uniformly through the holes into the soil. The design focuses on proper seed spacing, depth control, structural strength, and ease of operation. Mild steel is commonly used for fabrication due to its strength and availability. The developed machine increases field capacity, reduces seed wastage, minimizes labor requirement, and ensures uniform crop growth. Hence, the tractor mounted drum seeder improves productivity and supports modern mechanized farming practices.

Keywords— Tractor Mounted Drum Seeder, Agricultural Machinery, Seed Sowing Mechanism, Fabrication Process, Paddy Cultivation, Farm Mechanization, Seed Rate Control.

I. INTRODUCTION

Agriculture plays a vital role in the economic development of countries like India, where a large population depends on farming for their livelihood. Traditional methods of sowing seeds require more labor, time, and cost, and often result in non-uniform seed distribution. With the advancement of farm mechanization, modern agricultural implements are being developed to improve productivity and reduce manual effort.

The tractor mounted drum seeder is one such innovative implement designed mainly for sowing pre-germinated paddy seeds in wetland fields. It is attached to a tractor and operates using the motion of ground wheels to rotate perforated seed drums. As the tractor moves forward, seeds are dropped uniformly through the holes of the rotating drum, maintaining proper row spacing and seed rate. The main aim of designing and fabricating a tractor mounted drum seeder is to increase field efficiency, reduce labor dependency, ensure uniform seed placement, and minimize seed wastage. The machine is simple in construction, easy to operate, and economical for farmers. By adopting this technology, farmers can achieve better crop growth, higher yield, and reduced cultivation cost.

Thus, the tractor mounted drum seeder supports modern mechanized farming and contributes to improving agricultural productivity.

I. PROBLEM STATEMENT

1. Manual seed sowing requires more labor.
2. Seed distribution is not uniform.
3. Time required for planting crops is high.
4. Farmers need a low-cost mechanized solution.

The tractor mounted drum seeder helps overcome these problems.

II. OBJECTIVES

1. To design a tractor mounted drum seeder.
2. To fabricate the machine using simple materials.
3. To achieve uniform seed spacing.
4. To reduce labor and time required for sowing.
5. To improve efficiency of seed planting.
6. To make the machine affordable for farmers.

III. FABRICATION PROCESS

1. Cutting – Cutting metal plates to required size.
2. Grinding – Removing sharp edges and making smooth Surface.
3. Drilling – Making holes for bolts and shafts.
4. Welding – Joining metal parts together.

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5. Assembly – Connecting all components to make the final Machine.

IV. WORKING PRINCIPLE

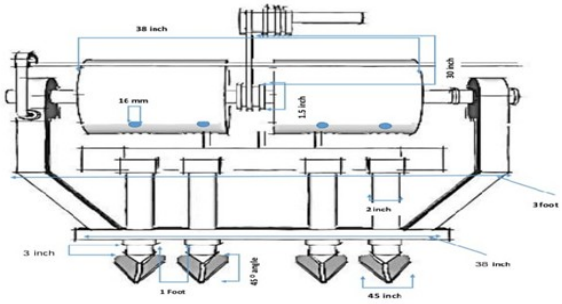

Fig no 1. Drum seeder

The diagram shows a Tractor Mounted Drum Seeder used for sowing seeds in rows while attached to a tractor. Below is a simple point-wise explanation of the parts shown in the diagram.

1. **Main Frame:** - The base structure of the machine. It supports all parts like drums, shaft, seed outlets and furrow openers.

2. Seed Drums: - Two cylindrical drums are shown. Each drum stores seeds and rotates when the tractor moves.

3. **Seed Holes (16 mm):** - Small holes are made on the drum surface. These holes allow seeds to fall at regular spacing while the drum rotates.

4. **Central Shaft:** - A shaft passes through the drums. It helps the drums rotate smoothly.

5. **Handle / Adjustment Lever:** - The handle on the top is used to adjust or control the drum.

6. Support Brackets: - These hold the shaft and drums firmly on the frame.

7. Seed Delivery Pipes: - Pipes are connected below the drums. Seeds fall through these pipes into the soil.

8. Furrow Openers: - The pointed triangular parts at the bottom. They open small furrows (lines) in the soil where seeds are placed.

9. **Row Spacing (4.5 inch): -** Distance between two seed rows. Ensures proper crop growth.

When the tractor moves forward, the drum rotates. Seeds drop from the drum holes into the pipes and fall into the furrows made by the furrow openers.

V. DIFFERENCE

Sr no.	Manual Tractor mounted drum seeder	Automatic tractor mounted drum seeder
1.	It is operated manually.	It does not required labor.
2.	Seeding is done manual with hands while using the drum seeder.	Seeds are automatically dropping with the rotation of drum
3.	labors are needed while using	Only one tractor operator is needed.
4.	Cost is higher of the manual tractor mounted.	Cost is low as compared to the manual tractor

VI. ADVANTAGES

1) Uniform Seed Distribution
2) Saves Time
3) Reduces Labor Requirement
4) Proper Row Spacing
5) Uniform Depth of Sowing
6) Higher Field Efficiency
7) Low Seed Wastage
8) Simple Construction
9) Low Maintenance Cost

VII. RESULTS AND DISCUSSION

The fabricated tractor mounted drum seeder was tested in field conditions to evaluate its performance and working efficiency. The machine was able to sow seeds uniformly in rows and maintain proper spacing between the seeds. During the testing, it was observed that the rotating drum distributed the seeds smoothly without blockage. The attachment with the tractor helped to cover a larger area in less time compared to manual sowing. The use of mild steel frame and drum provided good strength and durability to the machine. The seeder also reduced human labor and improved the speed of operation in the field.

The results showed that the tractor mounted drum seeder improves seed placement accuracy and increases productivity of the farmer. It helps in saving time, labor cost, and energy. The machine is simple in construction and easy to operate and maintain. Overall, the performance of the seeder was satisfactory and suitable for modern agricultural practices.

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VIII. FUTURE SCOPE

The tractor mounted drum seeder has good potential for future improvement and development. In the future, the machine can be modified to sow different types of seeds with adjustable seed spacing. Advanced materials can be used to reduce the weight of the machine and increase durability. Automation and sensor technology can also be added for better control of seed flow and accuracy. The design can be improved to work efficiently in different soil conditions. GPS or smart farming technology may also be used for precise seed placement. With these improvements, the tractor mounted drum seeder can become more efficient, reliable, and useful for modern farming.

IX. PREPARE YOUR PAPER BEFORE STYLING

For your project report on Tractor Mounted Drum Seeder, the section "Prepare your paper before styling" usually explains how the document should be organized before formatting or final design. You can write it like this. Prepare Your Paper Before Styling (Tractor Mounted Drum Seeder)

Before applying styles and formatting to the project report, it is important to prepare the paper in a clear and organized way. First, all the content related to the design and fabrication of the tractor mounted drum seeder should be collected and arranged properly. The report should include main sections such as title page, abstract, introduction, literature review, objectives, methodology, design details, working principle, results and discussion, conclusion, and references.

All headings and subheadings should be written clearly so that the report becomes easy to read and understand. Diagrams, images, and tables related to the tractor mounted drum seeder should also be inserted in the correct sections. The text should be checked for spelling, grammar, and accuracy before applying any formatting.

After organizing the content, proper alignment, font style, spacing, and numbering can be applied. Preparing the paper first helps to maintain a systematic structure and improves the overall quality of the project report.

X. ACKNOWLEDGEMENT

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XI. APPENDIX A: AN EXAMPLE APPENDIX

Appendix A provides additional information related to the design and fabrication of the tractor mounted drum seeder. The appendix section includes supporting data, calculations, drawings, and other materials that help explain the project but are not included in the main report.

In this project, Appendix A may contain detailed design calculations, dimensions of parts, and technical specifications of components used in the tractor mounted drum seeder. It can also include diagrams of parts such as the drum, frame, shaft, pulley, bearing, and seed hopper. These drawings help in understanding the construction and assembly of the machine. The appendix may also include tables showing material specifications, cost estimation, and testing results. Photographs of the fabrication process and the final assembled model can also be added in this section.

XII. CONCLUSION

The design and fabrication of a tractor mounted drum seeder is useful for improving the efficiency of sowing seeds in agricultural fields. This machine helps farmers to sow seeds in rows with proper spacing and depth. It reduces manual labor and saves time during the sowing process.

The drum seeder works with the help of a rotating drum that drops seeds into the soil as the tractor moves forward. The use of components such as the frame, drum, shaft, bearings, and seed hopper make the machine strong and reliable. The machine is simple in construction and easy to operate and maintain.

This project shows that the tractor mounted drum seeder can increase productivity and reduce the cost of farming operations. It is suitable for small and medium scale farmers and helps in achieving uniform seed distribution in the field.

Overall, the tractor mounted drum seeder is an effective and economical agricultural machine that can support modern farming and improve crop production.

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