Sugarcane Lifting Machine

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Abstract- *The sugarcane lifting machine is a mechanical device designed to reduce manual labor and improve efficiency in sugarcane handling during harvesting and loading. In traditional methods, workers manually lift and load heavy bundles of sugarcane, which requires more time, labor, and physical effort. The proposed sugarcane lifting machine uses a 1 HP gear motor, chain and sprocket mechanism, hollow shaft, bearings, and a 60-feet square rod frame to lift and move sugarcane from ground level to a higher platform or vehicle.*

The machine operates using a motor-driven chain conveyor system that lifts the sugarcane smoothly and continuously. Bearings are used to reduce friction and ensure smooth rotation of the shaft, while the sprocket and chain transmit power efficiently. This design helps increase productivity, reduce worker fatigue, and minimize time required for loading sugarcane.

The sugarcane lifting machine is simple in construction, cost-effective, and easy to operate, making it suitable for small and medium-scale farmers. It improves the overall harvesting process by providing a faster, safer, and more efficient method of lifting and transporting sugarcane.

Keywords: Sugarcane Lifting Machine, Chain and Sprocket Mechanism, Gear Motor, Hollow Shaft, Bearings, Agricultural Machinery, Material Handling System, Mechanization in Farming, Labor Reduction, Efficiency Improvement.

I. INTRODUCTION

Sugarcane is one of the most important agricultural crops in India and is widely used for the production of sugar, jaggery, and ethanol. During harvesting, sugarcane needs to be collected from the field and loaded onto vehicles for transportation to sugar factories. Traditionally, this process is done manually by laborers, which requires a lot of physical effort, time, and manpower. Lifting heavy bundles of sugarcane repeatedly can also cause fatigue and injuries to workers.

II. PROBLEM IDENTIFICATION

In the sugarcane harvesting process, loading sugarcane from the field to a vehicle or trolley is mainly done manually. This traditional method requires a large number of workers and involves lifting heavy bundles of sugarcane repeatedly. As a result, workers experience physical fatigue, injuries, and reduced efficiency. The process is also time-consuming and increases the cost of labor.

Another problem is that during peak harvesting season, there is often a shortage of labor, which delays the loading and transportation of sugarcane to sugar factories. Delays in transportation can affect the quality of sugarcane and reduce the efficiency of the overall harvesting process.

III. OBJECTIVE

The main objective of the sugarcane lifting machine is to design and develop a simple and efficient machine that can reduce the manual effort required in lifting and loading sugarcane during harvesting. The machine aims to minimize the dependence on manual labor and reduce worker fatigue. Another objective is to increase the speed and efficiency of the sugarcane loading process, which helps in saving time during harvesting. The machine uses a 1 HP gear motor with a chain and sprocket mechanism, along with a hollow shaft and bearings, to ensure smooth and reliable operation. It is also designed to be low-cost, easy to operate, and suitable for farmers and small-scale agricultural applications.

IV. WORKING PRINCIPLE

The sugarcane lifting machine works on the principle of power transmission using a motor, chain, and sprocket mechanism. When the 1 HP gear motor is switched on, it converts electrical energy into mechanical rotational motion. This rotational motion is transmitted to the sprocket mounted on the hollow shaft. The sprocket drives the chain, which moves continuously in a circular path.

As the chain rotates, the attached lifting structure carries the sugarcane from the ground level upward along the inclined frame made of square rods. Bearings are used to

support the shaft and reduce friction, allowing smooth rotation and efficient operation. The sugarcane placed on the lifting section is gradually moved upward and discharged at a higher level, such as into a trolley or transport vehicle.

V. ADVANTAGES

1. Reduces manual labor required for lifting and loading sugarcane.
2. Saves time and increases the efficiency of the loading process.
3. Reduces physical strain and fatigue of workers.
4. Simple design and easy to operate.5. Low maintenance and economical in cost.

VI. FOLLOWING ARE THE MAIN COMPONENTS OF AUTOMATED PORTABLE HAMMERING MACHINE

1. Sprocket
2. Chains
3. Bear motor
4. Nut& Bolt
5. Freewheel

1. Sprocket

2. Chains

3. Bear motor

4. Nut and bolts

5. freewheel

VII. CONCLUSION

The sugarcane lifting machine is an efficient and useful device that helps in reducing the manual effort required for lifting and loading sugarcane during harvesting. The machine uses a 1 HP gear motor, chain and sprocket mechanism, hollow shaft, bearings, and a strong square rod frame to lift sugarcane smoothly from ground level to a higher platform or vehicle.

By using this machine, the time required for loading sugarcane can be reduced and the physical strain on workers can be minimized. It also improves productivity and makes the harvesting process faster and safer. The machine is simple in construction, economical, and suitable for farmers and small-scale agricultural operations. Therefore, the sugarcane lifting machine is an effective solution for improving efficiency in sugarcane handling and transportation.

REFERENCES

[1] Bansal, R.K. – A Textbook of Strength of Materials, Laxmi Publications.
[2] Khurmi, R.S. and Gupta, J.K. – A Textbook of Machine Design, S. Chand Publications.
[3] Jain, R.K. – Production Technology, Khanna Publishers.
[4] Shigley, J.E. – Mechanical Engineering Design, McGraw Hill Publications.
[5] Information collected from agricultural machinery websites and research articles related to sugarcane handling equipment.
[6] Sugarcane Lifting Machine – Design and Fabrication Project. Mechanical Engineering Project Documentation.