

Design Development & Fabrication of Sugarcane Bud Cutting Machine

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Abstract— In today’s world, the entire requirements are being fulfilled through automatic system. The demand for reducing the wastage of sugarcane .So the search of automatic system is completed by this project. One alternative to reduce the mass and improve the quality of seed for sugarcane would be to plant excised axillaries buds of cane stalk, popularly known as bud chips. These bud chips are less bulky, easily portable and more economical material. The bud chip technology holds great promise in rapid multiplication of new sugarcane varieties. The problem of establishment and initial growth could be addressed by application of appropriate plant growth regulators and essential nutrients.

Key words: Sugarcane Bud Cutting Machine

I. INTRODUCTION

Agriculture is one of the most significant sectors of the Indian Economy. Agriculture is the only means of living for almost two thirds of the workers in India. The agriculture sector of India has occupied 43% of India’s geographical area, and is contributing 16.1% of India’s GDP (Gross Domestic Product). There are number of crops grown by farmers. These include different food crops, commercial crops, oil seeds etc. sugarcane is one of the important commercial crops grown in India. Sugarcane is grown primarily in the tropical and sub-tropical zones of the southern hemisphere. Sugarcane is the raw material for the production of white sugar. It is also used for chewing and extraction of juice for beverage purpose. About 7.5% of the rural population, covering about 45 million sugarcane farmers, their dependents and a large number of agricultural labors are involved in sugarcane cultivation, harvesting and ancillary activities.

II. CONSTRUCTION

A. Motor



Fig. 1: Electric Motor

Electric motor is an electrical machine that is used to convert electrical energy into mechanical energy. For smaller loads as in household application. Although traditionally used in fixed-speed service, induction motors are increasingly being used with variable-frequency drives in variable-speed service. VFDs offer especially important energy savings opportunities for existing and prospective induction motors

in variable-torque centrifugal fan, pump and compressor applications

B. Scotch Yoke Mechanism

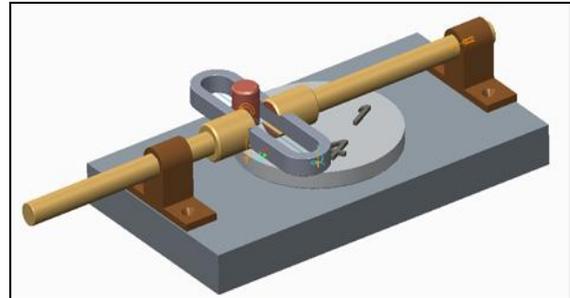


Fig. 2: Scotch Yoke Mechanism

The Scotch yoke (also known as slotted link mechanism [1]) is a reciprocating motion mechanism, converting the linear motion of a slider into rotational motion, or vice versa. The piston or other reciprocating part is directly coupled to a sliding yoke with a slot that engages a pin on the rotating part.

C. Frame



Fig. 3: Frame

The whole assembly is mounted on this frame. The complete frame is made up of mild steel. To give sufficient height to machine

D. Cutting Tool



Fig. 4: Cutting Tool

It is a tool that is used to cut material from the work piece by means of shear deformation. Cutting tool must be stronger than work piece. In shaper machine the cutting tool moves in a direction normal to the work piece. Ex: High speed steel, carbon steel, carbides, etc. The cutting tool material must

have the properties such as shigh hardness and strength at high temperature, good toughness and high tool life.

III. WORKING

It is the bud cutting machine tool designed for cutting sugarcane by a tool. The operation of machine is simplified to few simple operations involving a motor and tool head arrangement. When the crank is driven by a motor or by handle, the crank rotates about the axis, so the crankpin slides inside the slot of the slotted plate. As the crank rotates, the slotted bar reciprocates due to the sliding of crank pin. The connecting rod attached with the slotted plate on both sides, reciprocates as the crank rotates. The cutting tool is attached at the both sides of connecting rod, to carry out the cutting operation. Since the cutting tool is placed on both sides, operation can be done at both the sides of the machine i.e. the return stroke at one end is converted into cutting stroke at the other end, thereby it reduces the production time.

A. Assembled View



Fig. 5: Isometric View



Fig. 6: Front View



Fig. 7: Top View

IV. CONCLUSION

We have designed a dual side shaper with appropriate dimensions and analysed various properties for a cutting tool

(Shaper tool) using scotch yoke mechanism. We have applied various rapid wear of the slot in the yoke caused by sliding friction and high contact pressures. This wear can be reduced or controlled by maintaining lubricant near yoke. Scotch yoke mechanism plays an important role in shaping, planning, and slotting machine. This Mechanism is also used in scotch yoke engines. This can also be used in valve actuators in high-pressure oil and gas pipelines. It has been used in various internal combustion engines, such as the Bourke engine, SyTech engine, and many hot air engines and steam engines. It is best suitable for machining brittle materials like iron, copper, zinc etc

V. MERITS & DEMERITS

A. Merits

- 1) Save large amount of sugarcane bud from waste by plant in farm.
- 2) Initial cost of machine is very low.
- 3) Easy to handle for unskilled persons for e.g. farmers and labors related with farm.
- 4) Saved sugarcane bud used for fodder, pasturage for animals.
- 5) Sugarcane bud cutting operation is very fast as compare to traditional system of sugarcane planting.
6. Maintenance cost is negligible.

B. Demerits

Sharpness of cutting blades reduces after some weeks for that sharpness requirement is time to time Electricity is require.

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