



## **Pneumatically Sugarcane Bud-Cutting Machine**

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### **ABSTRACT**

Sugarcane is the main source of sugar in Asia and Europe. Sugarcane is the raw material for the production of white sugar, jaggery (gur) and khandsari. It is also used for chewing and extraction of juice for beverage purposes. The sugarcane cultivation and sugar industry in India plays a vital role towards socio-economic development in rural areas by mobilizing pastoral resources and generating higher income and employment opportunities. About 7.5 per cent of the rural population, covering about 45 million sugarcane farmers, their dependents and a large number of agricultural labourers are involved in sugar cane cultivation, harvesting and ancillary activities.

There are several methods for sugarcane bud chipping. It is by manually and also by the use of machines. Manual bud chip cutting with a hand knife is a common practice. These traditional tools used for bud chipping sugar cane are unsafe, messy, minimum productive and need skill and training. The risk of injury is also too high. This necessitates the development of an automated sugarcane bud chipping machine.)

**Keywords:** Sugarcane bud, , pneumatic cutter

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### **1. INTRODUCTION**

The main objective of our Project is to perform job holding and cutting operations effectively with less human effort by incorporating a machine with pneumatic power. This also takes less time due to its quick action. This pneumatic Sugarcane bud-cutting machine aims to provide better and faster bud-cutting operations with less human effort, thereby promoting agricultural activities of sugarcane cultivation. Nowadays, almost all manufacturing process is being atomized in order to deliver products at a faster rate. To achieve mass production, the automation of predefined tasks is necessary and is made mandatory in the current operating conditions of the industries.

#### **1.1 DRAWBACKS OF CONVENTIONAL CULTIVATION METHOD**

The conventional method of planting Sugarcane causes the chipping of the complete Sugarcane into several fragments with buds present at its nodes. This damages the Sugarcane completely and leads to causing a loss in the farmer's hands since they are unable to sell their cultivated sugarcanes to the industries such as sugar factories and other industries that use Sugarcane as their source of raw material. Tonnes of sugarcanes are chipped into used for planting, are then sold to the markets at very cheaper rates

#### **1.2 INTRODUCTION OF BUD CHIPS FOR PLANTING**

One alternative to reduce the mass and improve the quality of seed cane would be to plant excised axillary buds of cane stalk, popularly known as bud chips. These bud chips are less bulky, easily transportable and more economical seed material. The bud chip technology holds great promise in the rapid multiplication of new cane varieties. The sowing of buds of grown Sugarcane ensures the growth of new Sugarcane, thereby increasing the production rate and decreasing the damaging rate of the Sugarcane. The left-over cane can be well utilized for preparing juice or sugar, or jiggery.

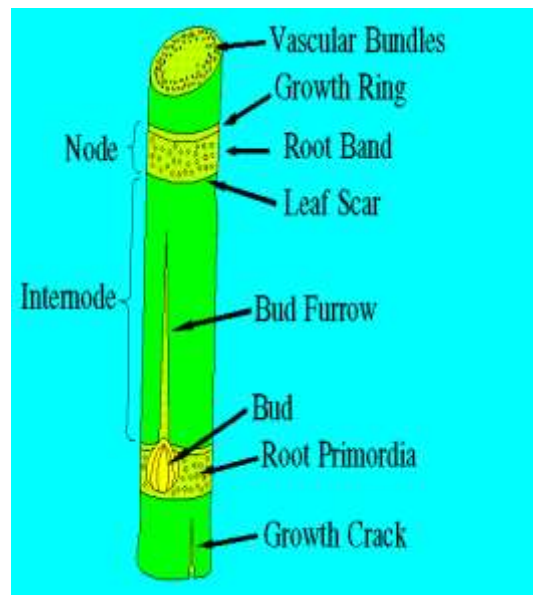


Fig. 1 - Representation of bud in Sugarcane

## 2. LITERATURE SURVEY

Vahid Jamadar[1] This research paper helps to design and fabricate a small-scale Sugarcane cutting machine for sugarcane harvesting to reduce farmers' efforts and to increase the production of agricultural goods. Compared to manual harvesting, this machine has the capacity to cut canes at a faster rate. It is economical. This paper helps in laying the design foundation for any aspiring user to fabricate a machine for application in their farms. It helps improve the economic growth of the nation.

Prakash Killedar et al. [2] Sugarcane is one of the important crops in India and many countries. The sugarcane industry remains the main pillar of the Indian economy. The sugarcane node cutting machine is developed for cutting the node of Sugarcane from Sugarcane. Due to the increasing demand for sugar in the market, many farmers are planting Sugarcane. But by using the old method of planting Sugarcane, there is more time required for cutting nodes. Due to this, more waste of time and Sugarcane. We produced a machine for cutting sugarcane nodes faster and avoiding the waste of time and effort required to cut the node of Sugarcane.

## 3. DESIGN OF BUD CUTTING MACHINE

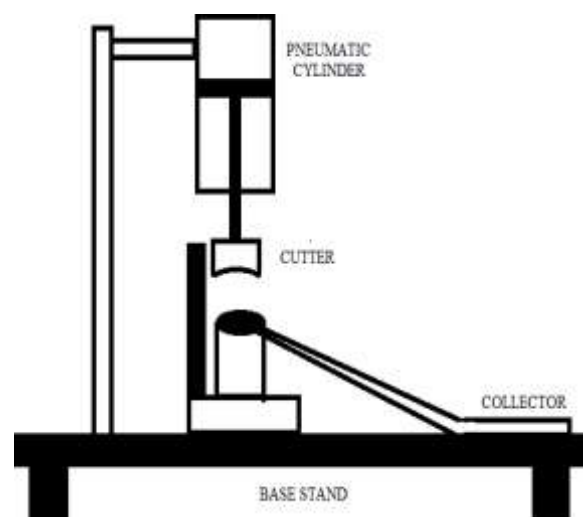


Fig. – 2 Design of Pneumatic sugarcane bud cutting machine

The actual model for bud cutting is manufactured after the study of the pictorial view of a model.

### **3.1 Working principle**

The compressed air from the compressor is used as the force medium for this operation. The machine uses a pneumatic double-acting cylinder and foot valves. The arm from the compressor enters the flow control valve. The controlled air from the flow control valve enters the foot valve. The function of foot valves is to control the extension and retraction of air from the cylinder at the correct time interval. The 5/2 foot valve is used. In one position, air enters the cylinder and pushes the piston so that the cutting stroke is obtained. In the next position, air enters the other side of the cylinder and pushes the piston return back so that the releasing stroke is obtained. The speed of the cutting and releasing stroke is varied by the human foot position.

### **3.2 Operations Involved**

#### **TURNING**

Turning is the operation of reducing a cylindrical surface by removing material from the outside diameter of a workpiece. It is done by rotating the workpiece about the lathe axis and feeding the tool parallel to the lathe axis. Due to this operation screw rod and head are done by the turning operation to get the required shape.

#### **FACING**

Machining the end of the workpiece to produce a flat surface is called facing. Due to this, the plate can get a flat surface have done by the facing operation.

#### **DRILLING**

Drilling is the operation of producing a cylindrical hole in the workpiece. It is done by rotating the cutting edge of the cutter, known as a drill bit. In this Project, the jig plates require holes for locating the indexing plate and screw rod and drill bush assembly. These holes are made by the conventional vertical drilling machine.

#### **THREAD CUTTING**

Thread cutting is the operation of forming an external thread of the required diameter of the rod by using a multipoint tool called a thread. This process is used in a screw clamp done on the rod, which is used for the movement of the movable plate.

#### **FINE GRINDING**

It is nothing but the grinding process, which is done as smoothly with fine grains. This is done as each plate and base plate for a good surface finish. It is done by a conventional grinding machine.

#### **GAS CUTTING**

It is used to break cut plates. This Project is used to cut raw materials such as plates. This is done by a gas-cutting machine.

#### **SHAPING**

Shaping operation is used to reduce the dimensions of the plates. In this Project, the plates are in need of a shaping process. It is done by a shaping machine.

#### **WELDING**

It is the process, which is used to join two, is more similar materials as well as dissimilar materials. In this Project, it is used to join the jig plate one to another. This is done by an arc welding machine.

After manufacturing, the SPM (Special Purpose Machine) will observe after applying all the above manufacturing operations.

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## **4. NEED FOR AUTOMATION**

Nowadays, almost all manufacturing process is being atomized in order to deliver products at a faster rate. The manufacturing operation is being atomized for the following reasons..

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## **5. CONCLUSIONS**

The Project carried out by us made an impressive task in the field of small-scale industries related to agricultural activities and automobile maintenance shops. It is very useful for workers to work in lathes and small-scale industries. This Project will reduce the cost involved in the concern. The speed of the cutting and releasing stroke is varied from human to human.

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