

FABRICATION OF SUGARCANE BUD REMOVAL MACHINE WITH ADVANCEMENTS

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ABSTRACT: While marketing and promoting the sugarcane bud chipper, that in sugarcane farming, many drudgery related issues have remained unaddressed. It observed that farmers prefer to plant sugarcane directly in the field manually, which is a cumbersome and time consuming process. Once the problem got identified, It started working on the solution. It is about the bud chipper which cuts the sugarcane buds in smaller size for the plantation purpose, where these buds are smaller in size compared with the earlier plantation method.

KEYWORDS: Chipper, buds, cumbersome.

1 INTRODUCTION

1.1 SUGAR CANE BUD CHIPPER

The current method of deploying sugarcane sets proved laborious, time consuming and costly, a farmer, faced acute difficulties in cultivation and alternative method of planting individual saplings did not help. It was hampered by lack of availability of saplings in large numbers. The farmer wondered whether the sugarcane buds, instead of being planted, could be sown like potatoes on the fields. That we discussed this idea with an expert .Based on the encouraging feedback we received to give it a try, we started working on the idea and developed a simple device, called sugarcane bud chipper, is floor mounted and equipped with a knife with a semicircular edge to surgically cut out the buds in a high impact operation, with clean finish and practically no damage to the cane. "Using this device a person can remove nearly 100 buds in an hour,"

Handling capacity the machine can also chop the cane into small pieces, is flexible, and can handle various sugarcane sizes and diameters. Traditional hand-held cutting tools create a strain on the hands and thumb, cause wastage, and damage with slanting cuts, and are incapable of dealing with hard plant grafting. Machine details The bud-chipper consists of a surface plate, holding stand, reciprocating assembly, actuating lever with adjustable screws, connector, U shaped cutting knife bolted with a spring stopper projecting downward into a matching groove, supporting studs and motor for generating thrust. "The unit allows the user to be comfortably seated on the ground and continuously feed the cane with the left hand, while running of motor to cut the sugarcane. Clean cut the semicircular cutting blade delivers a clean and complete cut in a two-step notch and cut operation. The high impact cutting action with outstretched arm and high shoulder slinging action generates the desired fast impact force for clean cutting," explains the farmer. The machine requires only power to run it, weighs a few kilograms making transport easy, the scope of this equipment lies beyond just removing buds from the sugarcane. It can be used more broadly as grafting equipment wherein buds of large plants can also be removed. "Experimenting with various cutting shapes, we finally developed a U-shaped cutting profile for cutting the bud in one swift movement of the blade without damaging the rest of the cane stalk. Table top version while toying with the idea of a table top version instead of existing floor based version, we realized that the design would become more compact to feed the cane at the exact height, for better performances.

1.2 NEED FOR BUD CHIPPER

The need for sugar cane bud chipper is only for the farmers, where they are using an full size of sugarcanes in the field for the plantation purpose, while using this sugar cane bud chipper we can cut it down in to small pieces, compact in size it can also used for plantation from this we save the wastage of remaining portion of the sugar cane.



Figure. 1. traditional method



Figure. 2. bud cutting method

2 METHODOLOGY AND OBJECTIVE

2.1 METHODOLOGY

- 1) Change Manual Method in to Automatic– By using appropriate capacity of single phase motor, gearbox which will reduce wastage and increase productivity as it will reduce strain on hands of worker and more emphasis on safety of operator.
- 2) New cutting technology –The research work in this domain was studied and new methods were developed to achieve desired goal.
- 3) Single phase operation –The power supplied to machine is single phase so to make it easy to operate at any location.
- 4) Safety–Highest priority is given to safety of the operator.

2.2 OBJECTIVE

To modify the design of bud chipping machine which can allow the farmer to cut the sugarcane bud in a form which can be utilized as a planting for agricultural of sugarcane. With ease and thus reducing the manual work of farmer and increases the production.

3 CLASSIFICATION OF METHODS

3.1 MOTORIZED METHOD

Electric motor is an electrical machine that is used to convert electrical energy into mechanical energy. For smaller loads as in household applications. Although traditionally used in fixed-speed service, induction motors are increasingly being used with variable-frequency drives in variable-speed service. Where the motor mounted on the table, where out valve is with the gear assembly, In that it is the easiest method when compared with manual method.

3.2 HAND PRESS METHOD

This method is made up of manual hand press method, where it is an time consuming process, and very difficult to cut the bus from the sugarcane, we need to give an high pressure to cut the bud. it consist of handle connected with the blade through the spring for the thrust giving purpose.

3.3 PEDAL PRESS METHOD

This type of machine is as same as the hand press method ,instead of handle we attached the foot pedal ,consist of a long rod or chain connected with the spring shaft attached with the blade ,by pressing the foot pedal the spring acts it cuts the sugarcane bud.

3.4 HYDRAULIC METHOD

Instead of motor we can also use an hydraulic motor ,where it was costly compared with all type of machines, it is very hard to be used by the farmer people, thus it have an less efficiency compared to all type of machine.

4 COMPONENTS

4.1 SINGLE PHASE MOTOR

Electric motor is an electrical machine that is used to convert electrical energy into mechanical energy, for smaller loads as in household applications. Although traditionally used in fixed-speed service, induction motors are increasingly being used with variable-frequency drives in variable-speed service.

4.2 FLY WHEEL

Flywheel is used to reduce speed of shaft and to control the rotation motion. Most modern gearboxes are used to increase torque while reducing the speed of a prime mover output shaft. This means that the output shaft of a flywheel rotates at a slower rate than the input shaft, and this reduction in speed produces a mechanical advantage, increasing torque. Some of the simplest gearboxes merely change the physical rotational direction of power transmission .A flywheel designed using a worm and worm-wheel is considerably smaller than one made from plain spur gear, and has its drive axes at 90° to each other. With a single start worm, for each 360° turn of the worm, the worm-gear advances only one tooth of the gear.

4.3 RECIPROCATING CHAMBER

It is the shaft or a chamber is connected with the flywheel through the connecting rod thus it was moving up and down to cut the sugar cane ,the blade attachment was fitted with the reciprocating chamber.

4.4 U- SHAPED BLADE

This is the main section of the sugarcane bud cutting machine. The chipper is used to cut the sugarcane bud and to get the same size of sugarcane bud. Because of cutter the wastage of sugarcane reduces and safety of farmer increases. It was made up of stainless steel and it was in curved shape for the compact cut.

4.5 CONNECTION RODS

The connection rods are used to connect the fly wheel and the reciprocating arrangement, one end of the connecting rod or shaft connected to the flywheel another end was connected to the reciprocating chamber, when the flywheel rotates it act as a slider crank mechanism for the movement of upside down.

4.6 SUPPORTING FRAME

The whole arrangement was done on the supporting frame, it was made up of the rods by attaching them up into a table or a frame, and it is very easy to done a machining an process on that frame.

4.7 SUPPORTING PLATE

It is the thick plate made of steel, where it was mounted on the supporting frame as a flat surface area on that we pointed a blade setting and motor setting arrangement.

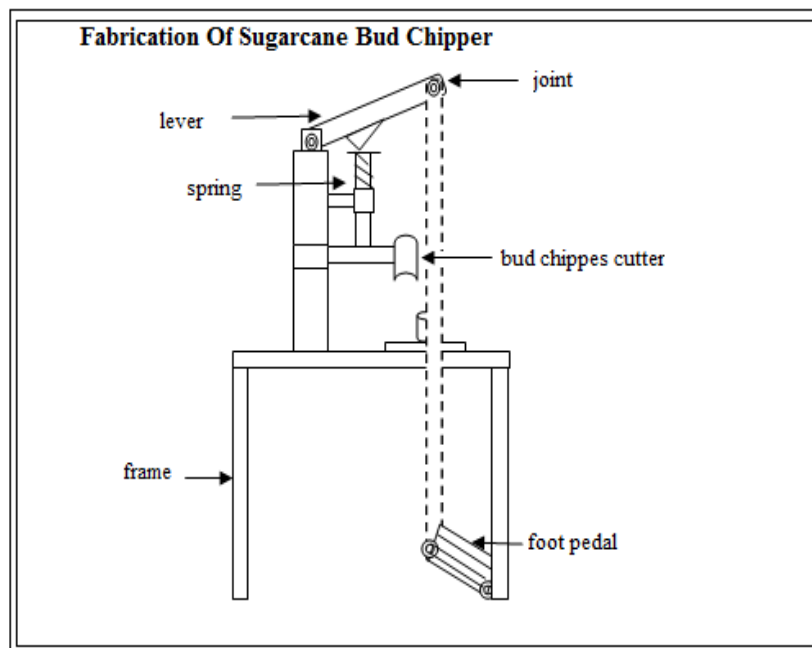


Figure 3. cutting process pedal type

5 WORKING

- A challenged by an engineer to make a machine that can remove buds from the sugarcane for the plantation purpose so as to minimize losses as well as time, money and seeds, with this implement.
- By pressing the food pedal, the unit removes the bud from the node of the sugarcane, which is then used for planting. It was hampered by lack of availability of saplings in large numbers. The farmer wondered whether the sugarcane buds, instead of being planted, could be sown like potatoes on the fields. The device consists of platform, hemi sphere chipping knife, sphere chipping knife, linkage system and handle, it is used to chip out the bud from sugarcane for sowing purpose and for tissue culture

- Novelty of the unit lies in foot lever operated hemi sphere chipping knife which provides gentle cutting of bud without extra loss of sugarcane during sowing. This ultimately gives higher income to the farmer by utilizing the remaining portion of the chipped canes which can be used for making sugar and also for any other purpose. This can also be using the electronic machine and hydraulic machine, This will save time instead of manual working or pedal working type machine, but their cost is high.
- In which we are using an electric motor in this chipper, because compared with the manual type of cutter this process is very easy to cut the buds from the sugarcane and it is very fast compared with the manual type.
- The hydraulic type of machine is so costly, where the farmers are not able to buy that type of costly machines.
- Where these consist of a hemispherical blade having a radius of 2.5 cm, in which the sugarcane buds are having ability for the plantation purpose.
- These are planted firstly in the plant bags after the certain period of time they seen a small growth of the leaves, after that the planted these sugar canes in the field.

6 ADVANTAGES

- Simple in construction.
- Initial cost is low.
- Easy to maintain.
- Less man power.
- Save large amount of sugarcane bud from waste by plant in farm.
- Sugarcane bud cutting operation is very fast as compare to traditional system of sugarcane planting.
- Saved sugarcanes are used for fodder, pasturage for animals or for the sugarcane industry.

7 APPLICATIONS

- These chippers are used by the formers.
- These are also used in sugar factories for the separation of buds.

8 CONCLUSION

The sugarcane bud cutting machine is very useful to small scale farmers to planting sugarcane bud. Also time is saved by this process as compare to the traditional system of sugarcane bud plant. Extra piece of sugarcane bud waste in small scale farm that can be saved by using sugarcane bud cutting machine that can be used as a fodder for animals.

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